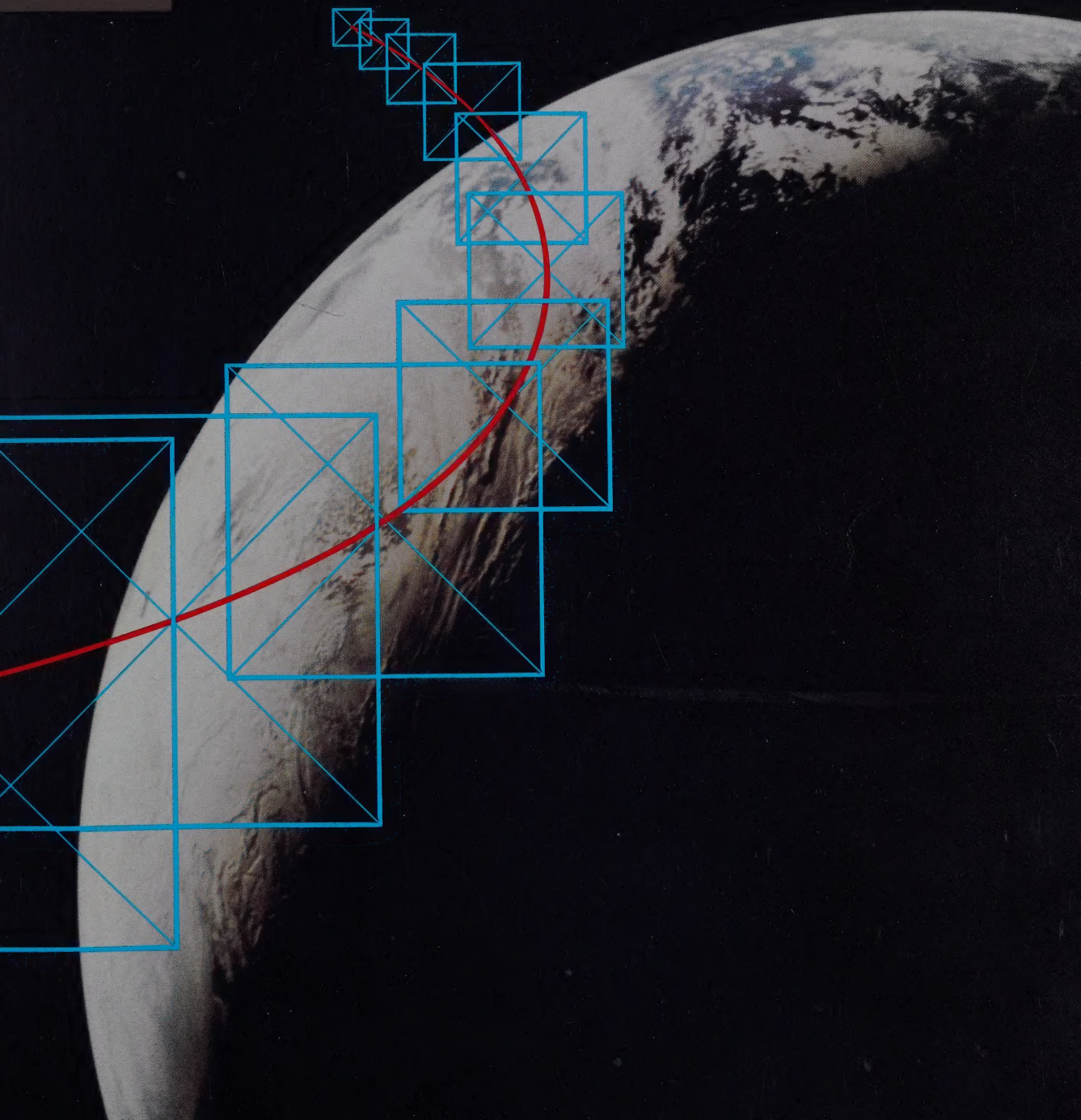






Cover: Linked by intelligent telecommunications networks, electronic telephones, computers and other intelligent terminals provide easy, immediate and universal human access to information. This is the Intelligent

Universe evolving from the confluence of computer and communications technologies. (Photograph courtesy of the United States National Aeronautics and Space Administration)

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### Northern Telecom Limited

Northern Telecom Limited is the principal supplier of telecommunications equipment in Canada and the second largest in North America. It is also a significant manufacturer of information processing equipment. It operates 30 manufacturing plants in Canada, 20 in the United States, and one each in the Republic of Ireland, Brazil, England, Malaysia, and Turkey. Bell-Northern Research Ltd., a subsidiary, with six research facilities in Canada and three in the U.S., is the largest industrial research and development organization in Canada.

### Form 10-K

The Form 10-K annual report for 1980 as filed by the corporation with the Securities and Exchange Commission in Washington, D.C. is available to shareholders without charge upon request to Roy T. Cottier, vice-president, corporate relations.

### Annual meeting

The annual meeting of shareholders will take place at 11 a.m., Thursday, April 23, 1981 in the Chateau Laurier Hotel, Ottawa, Ontario.

### Version française

On peut obtenir la version française de ce rapport en écrivant à l'adresse suivante:

Service des relations de  
l'entreprise  
Northern Telecom Limitée  
C.P. 458, succursale A  
Mississauga (Ontario)  
Canada L5A 3A2

### Versión española

Puede obtenerse la versión española de este informe solicitándola al

Corporate Relations Department  
Northern Telecom Limited  
P.O. Box 458, Station A  
Mississauga, Ontario  
Canada L5A 3A2





**Northern Telecom  
Limited**

1600 Dorchester Blvd. West  
Montreal, Quebec  
Canada H3H 1R1

has required it to establish subsidiaries and plants throughout the world. In most countries the subsidiaries were incorporated with Northern Electric as part of their name. In the United States, the world's largest single telecommunications market, and the one with the highest potential for us, this was not possible.

In the United States, the name Northern Electric is used by a manufacturer of electrical appliances. An additional complication there is the fact that a competitive telecommunications equipment manufacturer carries on business under the name North Electric.

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Northern Telecom Limited, formerly known as Northern Electric Company, Limited, is the principal manufacturer of telecommunications equipment in Canada and the second largest in North America. Sales in 1975 exceeded one billion dollars. Northern Telecom operates 24 manufacturing plants in Canada, six in the

the most respected in the world.

To reflect all of these considerations, and express them visually in a logotype, we examined scores of designs and typefaces. Eventually we decided to create a new typeface. The new typeface was evolved from the former Northern Electric "flash" type, and provides a continuity with it while conveying a feeling of modernity. We call this new typeface "Electrica".

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United States and one each in Ireland, Turkey and Malaysia. A subsidiary, Nedco (1975) Limited is the largest Canadian distributor of electrical and telecommunications products; an affiliate company, Bell-Northern Research Limited, maintains the largest industrial research organization in Canada.

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Northern Telecom  
Limited

1979

1980

A new name, a new look —  
for a new era

Northern Telecom Limited is the new name of Northern Electric Company, Limited, a long-established Canadian company that has, in recent years, become a successful international company.

There are a number of reasons for the change, but the two most important are: the need for a corporate name that is more descriptive of the products we make and the industry we serve, and the need to be able to market our products throughout the world under one corporate name.

#### Why Northern Telecom?

First, it has an obvious and immediate association with the telecommunications industry. Second, it is the name we have used for our United States' subsidiary since 1971, and the response to it there has been excellent.

The change in name does not represent a change in the policies or products of the company.

Northern Telecom Limited will continue to be Canadian-controlled and Canadian-based. It will continue to manufacture equipment for the telecommunications industry to the highest

The company's fast-develop-



AR18

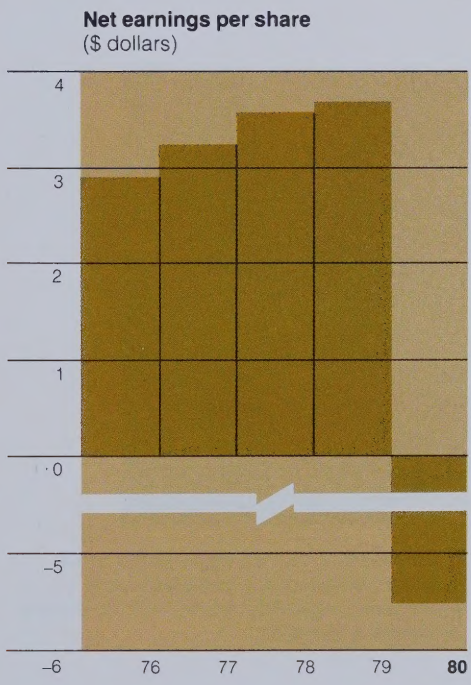
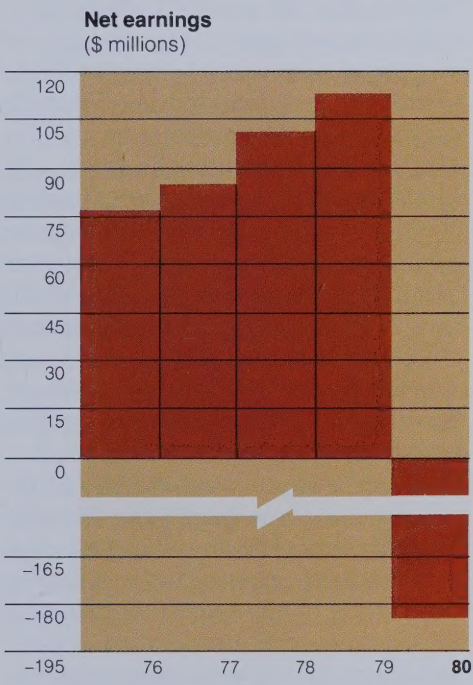
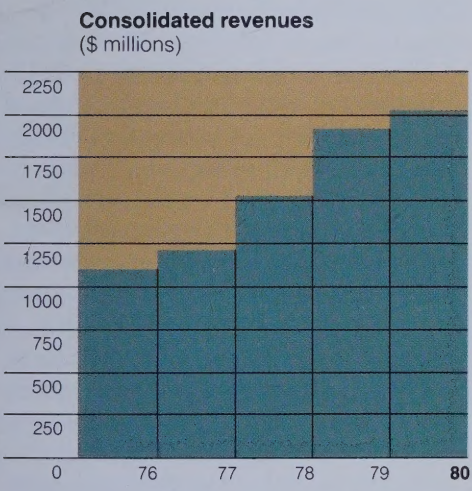
a new  
look

a new  
name



Financial highlights

|                                                   | 1980            | 1979            |
|---------------------------------------------------|-----------------|-----------------|
| Revenues .....                                    | \$2,054,561,000 | \$1,900,522,000 |
| Net earnings (loss) .....                         | (185,155,000)   | 113,472,000     |
| Net earnings (loss) per share .....               | (5.48)          | 3.70            |
| Dividends per share .....                         | 1.00            | 0.85            |
| Shareholders' equity .....                        | 728,314,000     | 917,615,000     |
| Working capital .....                             | 452,739,000     | 556,925,000     |
| Capital expenditures .....                        | 225,582,000     | 173,536,000     |
| Research and development expenditures (net) ..... | 140,946,000     | 132,639,000     |
| Shares outstanding (at Dec. 31) .....             | 34,432,788      | 33,592,901      |
| Shares outstanding (average during year) .....    | 33,795,140      | 30,655,915      |
| Shareholders .....                                | 13,737          | 8,039           |
| Employees .....                                   | 31,915          | 33,301          |





## Report to shareholders

There are many ways to measure a corporation's performance. The most obvious and frequently used measurement is the bottom line – earnings per share. By that measurement, 1980 was a bad year for Northern Telecom.

In applying that single measurement, however, we must not lose sight of the accomplishments and progress made during the year. We expect these will contribute significantly and positively to the corporation's profitability in 1981 and, to a greater extent, to the success of longer-term plans and strategies.

Consolidated revenues rose 8.1 percent in 1980 to a record \$2.055 billion, from \$1.901 billion in 1979. Telecommunications equipment revenues increased 16.4 percent, despite a worsening economic climate that increasingly curtailed sales of many product lines. Nevertheless, led by the demand for our digital telecommunications systems, our revenues and order backlogs continued to rise. These gains were somewhat offset, however, by a 26 percent decline in electronic office systems revenues.

In December 1980, Northern Telecom informed its shareholders that the corporation's Board of Directors had approved a recommendation by senior management to write off the remaining amount of goodwill and acquired value of the technology investment mainly related to the 1978 acquisitions of Sycor, Inc. and Data 100 Corporation. It also approved various expense provisions mainly related to the electronic office systems business (comprised of the former Sycor and Data 100 operations). These writeoffs and provisions amounted to about \$220 million.

Under Canadian accounting principles, \$163.8 million of these qualify as extraordinary items. The remaining approximately \$56 million of provisions was recorded as operating expenses. The corporation's loss in 1980 before the extraordinary items was \$21.4 mil-

lion, or \$0.63 per share. The net loss including the extraordinary items was \$185.2 million, or \$5.48 per share (based on an average of 33.8 million shares outstanding).

In 1979, Northern Telecom's net earnings were \$113.5 million, or \$3.70 per share (based on an average of 30.7 million shares outstanding).

A detailed analysis of the financial results for 1980 is presented in the Financial review, beginning on page 22.

The decline in earnings in 1980 is attributable to three principal factors: losses in our electronic office systems business; the effects of the economic recession, and start-up costs for our Digital Multiplex Systems (DMS).

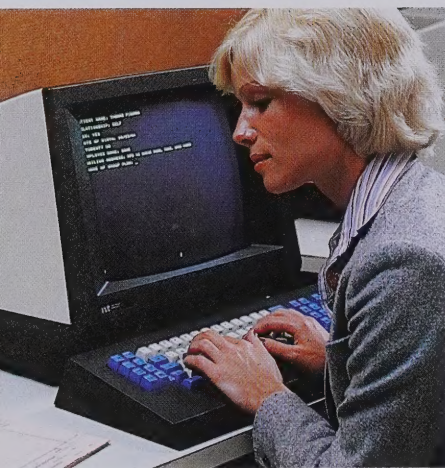
### Electronic office systems

The strategy behind the acquisitions of Sycor and Data 100 was stated in our annual report for 1978:

*"Our interest in these companies is not solely the development of a significant position in the data distribution industry. They are an essential element in the creation of a corporation that will be a leader in the clearly identified trend of a coming together of the telecommunications and data processing technologies. The combined technologies will be the telecommunications industry of the 1980s and beyond . . . We believe the future of the telecommunications industry will fall to those companies which can provide total communications network planning and production."*

We continue to believe in this long-term strategy.

Certainly, we underestimated the problems of integrating Sycor and Data 100 into one operating unit. We feel, however, that while it is expected that electronic office systems (EOS) will lose money in 1981, we are now on the right track toward seeing significant operating improvement in the performance of this business in 1981, and future profitability.



In December 1980, Northern Telecom announced Omniword, a complete word processing capability, for its distributed data processing systems.



The provisions recorded as operating expenses, and other factors discussed here and in the financial review, resulted in an operating loss of \$86.7 million in this business in 1980, compared with an operating profit in 1979 of \$26 million.

In 1980, the actions taken to pare the size of the EOS business to an efficient base on which we intend to build, included closing two manufacturing plants. This disrupted our operations, impairing our ability to ship new products and refurbish products in our lease base. These actions reduced manufacturing efficiencies and profitability in 1980.

Another factor was that in the second quarter 1980 we discontinued the sales of leases to third parties. In the past, equipment and leases were sold each quarter to third parties. This permitted us to realize immediately the beneficial cash flow, revenues and earnings.

Discontinuing lease sales means that the higher levels of financing and interest expense necessary to support the lease base, and marketing and administrative expenses have to be borne without offsetting revenues from lease sales.

This action was taken to permit the lease base to grow. However, lease revenues continued to decline during the second-half of 1980, resulting in our decision to write off the goodwill.

We expect that the actions taken in 1980 will result in improved performance by this business in the future, particularly as we strengthen our electronic office systems product lines with a number of new products and feature enhancements.

As well, we have recruited key executives, experienced in the electronic office systems business. However, they needed time to become knowl-

edgeable about our operations and to identify the course that should be taken to improve performance.

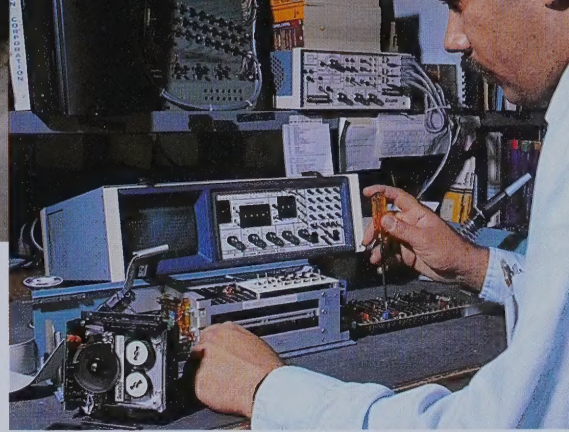
Marcelo A. Gumucio, 43, was appointed president of EOS in April 1980. Mr. Gumucio joined Northern Telecom Limited in 1979 as executive vice-president, marketing. He has 17 years experience in the international marketing of computers and electronic products with the General Electric, Hewlett-Packard and Memorex corporations.

Our research and development effort in this area is being closely coordinated with our R&D programs in telecommunications under the direction of Dr. Kay B. Magleby. Dr. Magleby, 44, was appointed president in May 1980 of BNR Inc., the U.S. arm of our R&D subsidiary, Bell-Northern Research Ltd. He joined BNR Inc. in 1979 as senior vice-president, planning and electronic office program. Prior to that he was president of Cushman Electronics Inc., San Jose, California for six years, and held positions with Hewlett-Packard; Fairchild Camera and Instrument, and was vice-president, engineering with Sycor, Inc. prior to its acquisition by Northern Telecom.

### **The recession**

Entering 1980, there were few clear signs of the timing and severity of the economic downturn. The situation worsened as the months passed and interest rates rose to historical highs, putting a crimp in the spending plans of many of our customers, especially the telephone companies. There was little or no real increase in capital spending for equipment in 1980 by the telephone companies in Canada and the United States, as the increase was about the same as the rate of inflation measured by the consumer price indices.

Virtually all product lines were affected, and several significantly more than others. This depressed our earnings to an even greater degree because those areas most affected were some of our



**Employees of Northern Telecom Inc.'s Spectron division in Moorestown, N.J. produce systems to test and monitor the transmission quality of data networks.**



**Northern Telecom will soon begin market testing of a new integrated voice and data terminal called Displayphone. This telephone terminal features a video display, and a keyboard which may be concealed when not in use.**

more established and mature products. The areas most affected included subscriber apparatus, cable and outside plant products.

Nevertheless, on the strength of our market leadership in such areas as digital switching and transmission systems, including DMS, the SL-1 digital business communications system, and various telecommunications network systems, Northern Telecom was able to achieve increased revenues for the eighth consecutive year. During this span, our revenues have nearly quadrupled from \$531.3 million in 1972.

### **Digital Multiplex Systems**

Northern Telecom's Digital World announcement in early 1976, when we became the first company in the world to announce plans and introductory dates for a complete family of digital switching and transmission systems, initiated a major transition process for the corporation. Demand for the new digital systems replaced orders for our established analog products and shipments of extensions for installed analog systems also declined. Orders and sales for the DMS family have risen sharply during the past several years as the products won widespread market acceptance. We undertook an unprecedented manufacturing capacity expansion.

One measurement of the transition is the trend in the mix of our central office switching revenues. In 1978, when our central office switching revenues declined from the previous year, digital switching accounted for only about \$36 million, or 10.6 percent of the total.

In 1979, this rose significantly with increased shipments of the DMS-10 small central office switch, and the first shipments of the DMS-100 Family switches (consisting of the DMS-100 local, DMS-200 toll, DMS-100/200 local/toll, and DMS-300 system for switching overseas calls). Digital

switching amounted to \$127 million, 32.9 percent of the \$386 million in switching revenues in 1979.

In 1980, with increased production of DMS-100 Family switches, our total switching revenues rose 30.9 percent, to \$505.2 million, with digital switching accounting for 53.2 percent, or \$269 million of the total.

The costs of the DMS-100 Family start-up were felt keenly during 1980. These were the usual and expected costs involved with bringing new production on stream, as well as other expenses such as the sizable growth in inventories necessary to build these new systems. We expected significant improvement in these expenses as shipments increased in the second half of 1980.

The improvements did not come to the degree expected. Striving to meet the formidable number of shipment and installation commitments to customers throughout North America, we encountered various difficulties. These difficulties included, in particular, obtaining a sufficient amount of acceptable quality components from a broad list of suppliers.

While our principal problem with the DMS-100 Family was meeting the demand for the system, the profitability of DMS-10 was affected by the recession as many orders were cancelled or deferred throughout the industry. Our shipments of DMS-10s were somewhat higher than in 1979, but they were well below our expectations, and this lower than planned increase impaired the profitability of these systems.

Entering 1981, demand continues to be strong for the large digital systems and we foresee a very substantial increase in DMS revenues.



The introduction of large systems like DMS is a costly and lengthy process; it is usually several years before such products become profitable for the manufacturer. This was true, for example, in the case of the SP-1, which became a highly successful product for Northern Telecom.

At the end of 1980, we had shipped or on order more than 200 DMS-100 Family switches, including 30 already in service. More than 440 DMS-10s had been shipped or were on order at the end of 1980, including 305 in service. This installed base represents an exciting potential for sales and earnings for many years to come as we sell equipment for capacity expansions, and enhancements such as Traffic Operator Position Systems, remote switching modules, and software-based features such as custom-calling features, introduced in 1980 for the DMS-10.

Northern Telecom has maintained its position as the leading supplier of digital switching systems in North America. Our market and technological leadership places us in the strongest position of any North American company in this business:

- Some 177 telephone companies in North America have bought or ordered DMS-10s, including companies in 44 states in the U.S., and six Canadian provinces, and in the Bahamas, Barbados and Puerto Rico.

- In July 1980, the first DMS-10 was delivered to an American Telephone and Telegraph (AT&T) company, Bell of Pennsylvania. On January 4, 1981, Cincinnati Bell put in service the first DMS-10 in the AT&T system, a switch





built into a mobile trailer, in Union, Kentucky. Four more DMS-10s were shipped in 1980 to Southern Bell of North Carolina, New England Telephone, the Chesapeake and Potomac Telephone Company of Maryland, and Southwestern Bell of Oklahoma. At yearend, 20 additional DMS-10s were on order by AT&T companies and we had received advance notification of pending orders for 150 more DMS-10s.

- The first DMS-100 for an AT&T company was placed in service in January 1981 in Ticonderoga, New York by the New York Telephone Company. This 2,500 line system will be expanded in 1981 to serve subscribers in nearby Hague, New York through a Remote Line Module off the base DMS-100 switch.

- At yearend 1980, Northern Telecom had sold or on order some 3.4 million equivalent lines (including long-distance trunks multiplied by five) for 1,797 DMS switching and transmission systems. This compares with 1.8 million equivalent lines for 1,272 DMS systems at the end of 1979.

### International highlights

While revenues from sales to Canadian customers rose 7.8 percent in 1980 compared with 1979, revenues from sales to customers outside of Canada were 8.4 percent higher than the 1979 level, accounting for 50.4 percent of total revenues. The fastest growth has been achieved outside of North America.

There were many notable achievements in international markets during 1980 and early in 1981. A few highlights include:

- Northern Telecom and Alfa Industries of Monterrey, Mexico incorporated a jointly owned marketing and manufacturing company in Mexico called Telko S.A. Telko will market and manu-

facture under license Northern Telecom's telecommunications systems for sale primarily in Mexico. These will include the Pulse electronic private automatic branch exchange (PBX), the SL-1, and the SM-1 key system for small businesses. Telko's first sale was eight SL-1s to a brokerage firm.

Alfa Industries is a part of Grupo Industrial Alfa, S.A., one of the largest companies in Mexico. It is involved in pulp and paper, steel, television and home entertainment, automotive engines, vacation resorts, fiber, food, petrochemicals and many other businesses.

Telko will establish a manufacturing plant at Celaya, 150 miles northwest of Mexico City. We expect this joint venture to result in substantial sales over the next decade of equipment, components and technology from Canada to Mexico. It will be some years, however, before these activities make a meaningful contribution to the corporation's earnings.

- Northern Telecom signed in February 1981, a contract with the Republic of Korea to supply during an 18-month period about \$60 million worth of digital transmission equipment from Canada to South Korea. Negotiations on a second phase of the contract are expected to begin later in 1981.

- Long-standing relationships with C. Olivetti & Co. of Italy and Computadores e Sistemas Brasileiros SA (COBRA) of Brazil, begun by Sycor before we acquired them, were continued with the signing in 1980 of new supply agreements.

Olivetti will have the exclusive right to market and support in Europe a series of Northern Telecom's IBM-compatible display stations. Revenues from this contract are expected to be about US\$13 million in 1981. COBRA will be receiving assembly kits for the 400 series of distributed data processing systems, under a US\$3.6 million contract.

Olivetti has also become a successful distributor in Italy of the SL-1. Its

**Visual Ear, featuring a keyboard and electronic display, may be easily coupled to a telephone to provide communications for those with impaired hearing or speech.**

contracts included a 3,500 line SL-1 to serve the Rome airport.

- The first major packet switching network outside of North America using Northern Telecom's SL-10 as the backbone of the system, was placed into service in July 1980 by the Deutsche Bundespost, the West German telecommunications authority. The system, called DATEX-P, consists of 19 SL-10 switches and will provide packet switching services throughout the country. SL-10 sales were also made in Belgium and Switzerland.

Sales of the SL-10 rose in 1980 to \$22 million from \$4 million the previous year.

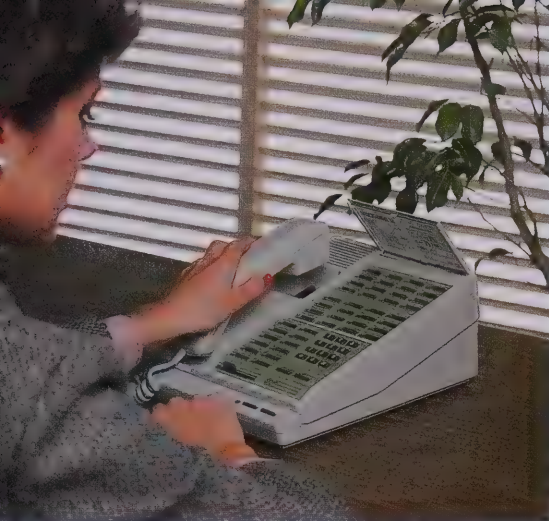
In January 1981, we announced our first contract for the SL-10 in the United States. Under the contract, valued at more than US\$10 million, Northern Telecom will supply, install, maintain and support an advanced nationwide data communications network for the U.S. Federal Reserve System. The network will link the banking system's operations in 14 locations.

Packet switching and the SL-10 are discussed in greater detail in the theme section of this report: *Networks for the Intelligent Universe*, beginning on page 12.

### New products

In recent years, Northern Telecom has brought to the market major new products in all of its principal product lines. Since the costs of introducing, marketing, and producing a product are highest in its first few years, this has been a factor in the decline of our profit margins. Some of the new prod-





**Vantage 12 is a new electronic key telephone system which can provide small businesses a broad spectrum of features generally only available in larger key systems or private branch exchanges.**

ucts announced during 1980 and in the first few months of 1981 include:

- The Vantage 12 key system, an advanced fully electronic telephone system for small businesses, which can serve up to six outside telephone lines and 12 telephones.
- The Model 435 distributed data processing (DDP) system which fits between the entry-level Model 405 and more powerful Model 445 to serve the needs of small offices and other sites which normally do not require larger computers.
- The Model 585, our most powerful DDP system (announced in February 1981) which offers up to twice the memory capacity and information throughput capability than our previously most powerful DDP system, the Model 445. The Model 585, which will be available in May, features a new processor and Winchester disk data storage technology.
- The Model 585 allows a combination of up to 16 cathode ray tube (CRT) data display stations and printers to be used on one processor and a total disk storage capacity of 342 million characters per system. A cost-effective solution for medium-size DDP requirements, the Model 585 expands our DDP product line to one of the most complete industry offerings in the 1-to-16 data stations DDP market.
- Omniword, a complete word processing package for our Model 405, 435, 445, and the new 585 DDP systems, and a letter-quality printer called the Striker, announced in December.
- A new family of on-line data display systems announced in January 1981. The family, compatible with IBM's Systems Network Architecture (SNA), comprises the Model 296C, a small cluster remote controller than can handle up to eight display stations and Sprinter bidirectional printers, and the Model 294C which can control up to 32 display stations and Sprinter printers.

- Displayphone (also announced in February 1981), an integrated voice and data terminal combining a telephone, video display screen and keyboard with programmed intelligence. It may be used to make telephone calls, access data bases, transmit and receive messages for an electronic mail system, and in a variety of other applications.
- PLC-1, a private line voice concentrator which may dramatically reduce the number of leased lines in private voice telecommunications networks.
- PC-ANI, the world's first processor-controlled automatic number identification system using microprocessors. It enables telephone companies automatically to identify for billing purposes the telephone number from which a long-distance call is being placed.
- An Enhanced Toll Position System, which automates the recording of billing and statistical data for operator-assisted long-distance calls.
- The Electronic Switched Network (ESN) which will provide more efficient and cost-effective private communications for voice and data for organizations with anywhere from 2 to 100 locations within a metropolitan area or across the North American continent. The heart of the ESN is the SL-1.
- The SL-1 and Displayphone are a few of the many products which have been developed by Northern Telecom's research and development subsidiary, Bell-Northern Research Ltd.

### **Research and development**

In 1981, Bell-Northern Research (BNR) marks its 10th anniversary. Established on the base of Northern Telecom's existing R&D laboratories in 1971, BNR has in the past decade compiled an impressive list of achievements. A partial list of the major products developed by BNR, manufactured and successfully sold by Northern Telecom, includes the SP-1, Pulse, SL-1, SL-10, the DMS family of digital switching and transmission systems, Contempra telephone, DRS-8 digital



**Research and development in semiconductor technology is carried out by Bell-Northern Research and Northern Telecom's Semiconductor Components Group, both located in Ottawa, Ontario.**



microwave radio, the Imagination line of telephones, the Logic family of modular business telephones, and the SM-1 and Vantage 12 key telephone systems for business.

BNR has grown to become a leading, internationally recognized R&D organization. It is the largest industrial R&D organization in Canada, with 2,210 employees in six laboratories in Ottawa and Toronto, Ontario; Montreal, Quebec, and its newest facility in Edmonton, Alberta, which opened in 1980. In the United States, BNR's subsidiary, BNR Inc., operates three laboratories in Mountain View, California; Ann Arbor, Michigan, and Minnetonka, Minnesota, employing 577 people. BNR's 1980 revenues, including R&D performed for Northern Telecom, Bell Canada, and other customers was \$143.3 million in 1980.

Northern Telecom has often stated its belief that to be a leader in high-technology businesses requires a consistent commitment to R&D. The poor earnings performance in 1980 did not change that commitment as net R&D expenditures by the corporation rose to \$140.9 million, or 6.9 percent of total revenues, compared with \$132.6 million, or 7 percent of total revenues in 1979. Much of this R&D investment was made through BNR, accounting for \$80.6 million of the total in 1980. The remainder was spent by many of our manufacturing operations which also have sizable R&D organizations employing nearly 1,000 people responsible for developing new products, and sustaining and evolving products already in the market.

In January 1981, C. Denis Hall, president of BNR, was appointed executive vice-president, marketing and technology for Northern Telecom Canada (NTC). The R&D achievements at BNR during the past several years while Dr. Hall was its president enabled North-

ern Telecom to seize and maintain international leadership in digital telecommunications technology. His experience will be a valuable asset to NTC and its efforts to serve its customers.

Concurrently, Donald A. Chisholm, the corporation's former executive vice-president, technology, was appointed to a new line position, president, innovation and development. Dr. Chisholm will be president of BNR, continues to serve as its chairman, and will also be responsible for the Semiconductor Components Group. John A. Roth was appointed executive vice-president of Bell-Northern Research, responsible for its activities in Canada and the U.S. Mr. Roth began his career at Northern Telecom in 1969 in the R&D laboratories in Ottawa which subsequently became BNR, and most recently was the corporation's vice-president, operations, manufacturing.

### **More manufacturing plants**

Northern Telecom Canada announced in 1980 that it is establishing the headquarters of its Optical Systems Division and a new 91,000-square-foot production facility for fiber optics communications systems in Saskatoon, Saskatchewan.

In Canada, Northern Telecom also began production of business communications products in rented premises in Calgary, Alberta, pending completion of a 150,000-square-foot facility, and opened a 45,000-square-foot plant in North York, Ontario for the repair and calibration of telecommunications and electronics equipment.

Work was completed on the final phase of our Ottawa, Ontario facility for the design and manufacture of proprietary large-scale-integrated (LSIs)

circuits. This is the largest manufacturing facility for LSIs in Canada, and will produce about \$30 million worth of custom LSIs annually for use in Northern Telecom's products and those of other Canadian manufacturers. The 113,000 square feet of facilities, including laboratories for Northern Telecom's LSI research and development, represent an investment of more than \$36 million. It features the only production line for 100 millimeter silicon wafers (from which integrated circuits are cut) in Canada. Initial yields of good LSIs per wafer have been twice the industry norm, and in some cases higher.

A second custom-LSI fabrication facility is currently under construction in Rancho Bernardo (near San Diego), California.

Northern Telecom has invested more than \$47 million during the past seven years in the R&D of custom LSIs. Northern Telecom, for example, was about two years ahead of any other company in the world in designing and producing an LSI combining a filter, and signal coding and decoding capability on a single chip (called a filter codec). The filter codec is an essential element in the DMS switches. Northern Telecom had produced some 800,000 filter codecs by the end of 1980.

In the U.S., the new 250,000-square-foot manufacturing plant for DMS in Raleigh, North Carolina, was completed in late 1980. A 70,000-square-foot expansion of the business communications systems plant in Santa Clara, California was completed and occupied in the summer.

### **Northern Telecom Inc.**

During the past five years, Northern Telecom's operations and revenues in the United States grew with startling rapidity. Revenues increased from \$91.9 million in 1975 to \$793.7 million in 1980. We acquired five companies



**Completion of a printed circuit board at Northern Telecom Inc.'s Network Systems Group's manufacturing plant in Richardson, Texas.**



in this period: Cook Electric in 1976, and Spectron Corp., Danray Inc., Sycor, and Data 100 in 1978.

Effective January 1, 1981, we consolidated all our U.S. manufacturing, marketing and service operations under one company. The consolidation is designed to achieve improved operating efficiencies, and to enable Northern Telecom to present a single and unified profile in the U.S.

The consolidation merges a number of companies, including Northern Telecom Industries, Inc., the corporation's former holding company in the U.S., and Northern Telecom Systems Corporation (NTSC), formerly responsible for the electronic office systems business, into Northern Telecom Inc. (NTI). BNR Inc. continues as a subsidiary of Bell-Northern Research Ltd., and will work closely with NTI. The management of the R&D operations of electronic office systems in Ann Arbor and Minnetonka have been integrated into BNR Inc. to bring together more effectively our total technological resources to develop new products for the electronic office systems market.

Edmund B. Fitzgerald, 55, who joined Northern Telecom in May 1980 as president of Northern Telecom Industries, was named president of Northern Telecom Inc. In January 1981, Mr. Fitzgerald was elected to the corporation's Board of Directors.

Mr. Fitzgerald's extensive business career has included serving as vice-chairman and chief operating officer, industrial products of the Eaton Corporation, Cleveland, Ohio, and chairman and chief executive officer of Cutler-Hammer Inc., Milwaukee, Wisconsin.

As a part of the consolidation, four new senior management positions were created to strengthen the NTI organization.

Charles G. Millar, Northern Telecom Limited's executive vice-president, operations, was appointed president, digital switching systems for NTI with global responsibility for Northern Telecom's digital switching operations.

H. Lloyd Webster, former senior vice-president, marketing and technology for Northern Telecom Canada, was appointed senior vice-president, technology, digital switching systems. Mr. Webster will report to Mr. Millar, who reports to Edmund Fitzgerald.

Also reporting to Mr. Fitzgerald will be Michael H. Cochrane, appointed executive vice-president finance and administration, and George W. Sullivan, who becomes executive vice-president corporate development. Mr. Cochrane had joined Northern Telecom Limited as executive vice-president, administration, at mid-1980 after serving in senior management positions at a number of large multinational corporations. Mr. Sullivan was formerly responsible for NTI's telecommunications systems operations.

### **The future**

In 1980, Northern Telecom was officially informed that it will receive one of the world's most prestigious industrial awards, the International Industrial Award, presented annually by the Institut International de Promotion et de Prestige, of Geneva, Switzerland.

The Institut, an independent organization established about 17 years ago,

is affiliated with the United Nations through UNESCO. Membership is by nation and not by individual business or organization; its awards committee consists of senior international industrialists and academics.

Northern Telecom is the first Canadian, and only the second North American company, to receive the award; the other North American recipient was the IBM Corporation. It is being given to Northern Telecom for several reasons. In particular, it is in recognition of our emergence as a successful multinational, our technological leadership and a record of penetrating key telecommunications markets outside Canada.

We are proud to have been chosen for this international honor. It serves as a reminder to us that the tribulations of the past year are, in fact, not ill portents for the future. On the contrary, we are well positioned to achieve a healthy rate of growth in revenues and earnings in the 1980s.

In the first-half of 1981, we believe the poor economic climate will continue to be a significant factor. It will also take us some months to achieve improved operating performance in the electronic office systems business. Nevertheless, we are cautiously confident that improvement in our earnings performance will be gradually achieved during this period.

Our order backlog for the first time exceeded a billion dollars at the end of 1980. Orders on hand were \$1.004 billion, compared with \$874 million at the end of 1979.

We are looking forward to an exciting year, and a prosperous decade.

Walter F. Light  
President and Chief Executive Officer

A. Jean de Grandpré  
Chairman of the Board



## Directors

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><sup>3</sup> David W. Barr<br/><i>Chairman of the Board<br/>Moore Corporation Limited<br/>Toronto, Ontario</i></p> <p><sup>2</sup> William O. Beers<br/><i>Former Chairman of the<br/>Board and CEO<br/>Dart &amp; Kraft, Inc.<br/>Chicago, Illinois</i></p> <p><sup>3</sup> A. Jean de Grandpré, Q.C.<br/><i>Chairman of the Board<br/>Northern Telecom Limited<br/>Chairman of the Board and<br/>Chief Executive Officer<br/>Bell Canada<br/>Montreal, Quebec</i></p> <p><sup>4</sup> Georges L. Demers, Q.C.<br/><i>Senior partner<br/>Demers, Gosselin and<br/>Robitaille<br/>Quebec City, Quebec</i></p> | <p><sup>2,3</sup> J. Douglas Gibson, O.B.E.<br/><i>Chairman of the Board<br/>Canadian Reinsurance<br/>Company<br/>Canadian Reassurance<br/>Company<br/>Toronto, Ontario</i></p> <p><sup>4</sup> Donald S. Harvie<br/><i>Chairman<br/>Devonian Group<br/>Calgary, Alberta</i></p> <p><sup>1,2</sup> Robert S. Hurlbut<br/><i>Chairman of the Board<br/>and President<br/>General Foods, Limited<br/>Toronto, Ontario</i></p> <p><sup>1,4</sup> Walter F. Light<br/><i>President and<br/>Chief Executive Officer<br/>Northern Telecom Limited</i></p> | <p><sup>1,2</sup> Clifford S. Malone<br/><i>President and<br/>Chief Executive Officer<br/>Canron Inc.<br/>Toronto, Ontario</i></p> <p><sup>2,4</sup> Vernon O. Marquez<br/><i>Consultant<br/>St. Lazare, Quebec</i></p> <p><sup>1</sup> John H. Moore<br/><i>Chairman of the<br/>Executive Committee<br/>London Life Insurance<br/>Company<br/>London, Ontario</i></p> <p><sup>3</sup> William L. Naumann<br/><i>Former Chairman<br/>of the Board and<br/>Chief Executive Officer<br/>Caterpillar Tractor Co.<br/>Peoria, Illinois</i></p> <p><sup>2</sup> Charles Perrault<br/><i>President<br/>Perconsult Limited<br/>Montreal, Quebec</i></p> | <p><sup>1,3</sup> Gérard Plourde, O.C.<br/><i>Chairman of the Board and<br/>Chief Executive Officer<br/>U.A.P. Inc.<br/>Montreal, Quebec</i></p> <p><sup>2,4</sup> Robert C. Scrivener<br/><i>Former Chairman of the Board<br/>and Chief Executive Officer<br/>Northern Telecom Limited</i></p> <p><sup>1,3</sup> James C. Thackray<br/><i>President<br/>Bell Canada<br/>Montreal, Quebec</i></p> <p><sup>4</sup> W. Maurice Young<br/><i>Chairman of the Board and<br/>Chief Executive Officer<br/>Finning Tractor and Equipment<br/>Company Limited<br/>Vancouver, British Columbia</i></p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

<sup>1</sup> Member of the executive committee

<sup>2</sup> Member of the audit committee

<sup>3</sup> Member of the management resources  
and compensation committee

<sup>4</sup> Member of the pension fund policy  
committee

## Officers

### Chairman of the Board

A. Jean de Grandpré, Q.C.

### President and

### Chief Executive Officer

Walter F. Light

### Executive vice-presidents

Walter C. Benger  
*Marketing*

Donald A. Chisholm  
*Technology*

Michael H. Cochrane  
*Administration*

Robert A. Ferchat  
*Finance*

Charles G. Millar  
*Operations*

### Vice-presidents

Clive V. Allen  
*General counsel*

Roy T. Cottier  
*Corporate relations*

J. Derek M. Davies  
*Business development*

F. Robert Dyer  
*Market development*

Desmond F. Hudson  
*Technology planning*

Ronald A. Hunter  
*Operations, planning*

Robert H. Lane  
*Marketing, administration*

John D. MacDonald  
*Technology management*

Edward B. Matthews  
*Business systems*

John A. Roth  
*Operations, manufacturing*

Lloyd A. Taylor  
*Semiconductor components*

### Treasurer

David W. Kendall, Jr.

### Secretary

Anthony J. Lafleur

### Controller

David J. Thomas



# Northern Telecom Limited and principal subsidiaries

As at December 31

Northern Telecom Limited, with its executive offices in Mississauga (near Toronto), Ontario, establishes the corporate policies and strategies for its principal subsidiaries.

Northern Telecom Canada's manufacturing plants produce a broad range of telecommunications products and systems for the Canadian market and for export. Many of

these exports are sold by Northern Telecom International which is also based in Canada. Northern Telecom has sold telecommunications equipment in more than 70 countries.

Following the yearend 1980 consolidation of the corporation's U.S. activities (excluding R&D), Northern Telecom Inc. (NTI) is responsible for all manufacturing, marketing and service activities in the telecommunications and electronic office systems

operations in the U.S., as well as the electronic office systems business in international markets.

Bell-Northern Research Ltd., the largest private industrial research and development organization in Canada, operates six laboratories in Canada and three in the United States.

## Northern Telecom Limited

Mississauga, Ont.  
Revenues, \$2.055 billion  
Assets, \$1.986 billion  
Employees, 33,738†

### Northern Telecom International Limited

Mississauga, Ont.  
Employees, 2,482†

Malaysia  
Penang  
Republic of Ireland  
Galway  
Turkey  
Istanbul

### Northern Telecom Canada Limited

Islington (Toronto), Ont.  
Employees, 15,736

**Subscriber Equipment**  
Amherst, N.S.  
Belleville, Ont.  
Calgary, Alta. (2)\*  
London, Ont.  
Regina, Sask.  
Saint John, N.B. (2)  
Montreal North, Que.  
North York, Ont. (2)

**Switching**  
Brampton, Ont.  
Calgary, Alta.  
Charlottetown, P.E.I.  
LaSalle, Que.  
Montreal, Que.  
St. John's, Nfld.

**Transmission**  
Aylmer, Que.  
Kanata, Ont.  
St. Laurent, Que.  
Saskatoon, Sask.\*  
Winnipeg, Man.

**Cable**  
Amherst, N.S.  
Calgary, Alta.  
Kingston, Ont.  
Lachine, Que.  
Regina, Sask.  
St. Laurent, Que.

**Semiconductor Components Group**  
Ottawa, Ont.

### Northern Telecom Inc.

Nashville, Tenn.  
Employees, 12,359

**Electronic Office Systems**  
Minnetonka, Minn.  
Montevideo, Minn.  
St. Paul, Minn.  
Warwick, R.I.  
Great Britain  
Hemel Hempstead

**Telecommunications Switching**  
Creedmoor, N.C.  
Raleigh, N.C.  
West Palm Beach, Fla.  
Morrisville, N.C.

**Products**  
Concord, N.H.  
Kevil, Ky.  
Leesburg, Fla.  
Moorestown, N.J.  
Morton Grove, Ill.  
Nashville, Tenn.  
Sanford, N.C.

Tampa, Fla.  
Texarkana, Tex.  
Brazil  
Rio de Janeiro  
Canada  
Winnipeg, Man.

**Network Systems**  
Richardson, Tex.

**Transmission**  
Atlanta, Ga.

**Business Communications Systems**  
Santa Clara, Cal.

**Semiconductor Components Group**  
Rancho Bernardo, Cal.\*

### Bell-Northern Research Ltd.

Ottawa, Ont.  
Employees, 2,210

Ottawa, Ont. (3)  
Toronto, Ont.  
Montreal, Que.  
Edmonton, Alt.

### BNR Inc.

Mountain View, Cal.  
Employees, 577

Mountain View, Cal.  
Minnetonka, Minn.  
Ann Arbor, Mich.

This chart is not intended to denote the legal or parent-subsidiary relationships. It reflects the

administrative organization of the corporation as at December 31, 1980.

\* Plant under construction

† Includes 1,823 employees of NETAS



# Senior management of principal subsidiaries

As at December 31

| Bell-Northern<br>Research Ltd.                                                                    |                                                                     | BNR Inc.                                                             |                                                                 | Data 100 Europe B.V.                                                      |  | NETAS-Northern Electric<br>Telekomünikasyon A.S.                    |  |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------|--|---------------------------------------------------------------------|--|
| <b>Chairman of the Board</b><br>Donald A. Chisholm                                                | John Elliott<br><i>Network products</i>                             | <b>Chairman of the Board</b><br>C. Denis Hall                        | Diju Raha<br><i>Systems</i>                                     | <b>Managing director</b><br>Robert H. Lane                                |  | <b>Chairman of the Board</b><br>William T. Simpson                  |  |
| <b>President</b><br>C. Denis Hall                                                                 | Harvey S.W. Goodwin<br><i>Administration</i>                        | <b>President</b><br>Kay B. Magleby                                   | Eugene J. Swystun<br><i>Development</i>                         |                                                                           |  | <b>Managing director</b><br>C. Roger Lawton                         |  |
| <b>Group vice-president</b><br>L. Colin Beaumont<br><i>Development</i>                            | Robert Kenedi<br><i>Systems</i>                                     | <b>Vice-presidents</b><br>Peter P. Gruchala<br><i>Administration</i> | Lee Talbert<br><i>Advanced business<br/>systems</i>             |                                                                           |  | <b>General secretary</b><br>Iskander N. Taner                       |  |
| <b>Vice-presidents</b><br>John Aitchison<br><i>Custom systems<br/>development</i>                 | Alan G. Lutz<br><i>Terminals products<br/>division</i>              | Ray Kavlick<br><i>Ann Arbor laboratory</i>                           | <b>Secretary</b><br>Roméo C. Champagne                          |                                                                           |  | <b>Controller</b><br>James E. Hughes                                |  |
| Howard M. Bender<br><i>Switching development</i>                                                  | Lloyd A. Taylor<br><i>Technology</i>                                |                                                                      |                                                                 |                                                                           |  |                                                                     |  |
| John S. Buchan<br><i>Corporate development</i>                                                    | <b>Secretary and legal<br/>counsel</b><br>Roméo C. Champagne        |                                                                      |                                                                 |                                                                           |  |                                                                     |  |
|                                                                                                   | <b>Treasurer and controller</b><br>Frank T. Chaikowsky              |                                                                      |                                                                 |                                                                           |  |                                                                     |  |
| Northern Telecom A.G.                                                                             |                                                                     | Northern Telecom<br>(CALA) Corporation                               |                                                                 | Northern Telecom<br>Canada Limited                                        |  |                                                                     |  |
| <b>Managing director</b><br>Hugh A. Hamilton                                                      | <b>Managing director</b><br>Mendel C. Cohen                         | <b>President and general<br/>manager</b><br>Jean-Paul Gagnon         | <b>President</b><br>Basil A. Beneteau                           | <b>Senior vice-presidents</b><br>Donald A. Noble<br><i>Administration</i> |  | Robert M. Cuddy<br><i>Manufacturing</i>                             |  |
|                                                                                                   |                                                                     |                                                                      | <b>Group vice-presidents</b><br>André J. Boutin<br><i>Cable</i> | H. Lloyd Webster<br><i>Marketing and technology</i>                       |  | Richard A. Fortier<br><i>Personnel and industrial<br/>relations</i> |  |
|                                                                                                   |                                                                     |                                                                      | Ewart O. Bridges<br><i>Switching</i>                            | <b>Vice-presidents</b><br>Clare A. Anderson<br><i>Western Canada</i>      |  | Roy Merrills<br><i>Subscriber switching</i>                         |  |
|                                                                                                   |                                                                     |                                                                      | David G. Vice<br><i>Transmission</i>                            | David D. Archibald<br><i>Secretary and general<br/>counsel</i>            |  | Elliott Turcot<br><i>Advanced switching</i>                         |  |
|                                                                                                   |                                                                     |                                                                      | Kenneth H. Woodley<br><i>Subscriber equipment</i>               | John W. Caffry<br><i>Controller and treasurer</i>                         |  | D. Wynn Walters<br><i>Public relations</i>                          |  |
| Northern Telecom Inc.                                                                             |                                                                     | Northern Telecom<br>Industries Sdn. Bhd.                             |                                                                 | Northern Telecom<br>International Limited                                 |  | Northern Telecom<br>(Ireland) Limited                               |  |
| <b>President</b><br>Edmund B. Fitzgerald                                                          | <b>Vice-Presidents</b><br>William C. Cawthon<br><i>Operations</i>   | <b>Managing director</b><br>Ho Boon Theam                            | <b>President</b><br>William T. Simpson                          | <b>Chairman of the Board</b><br>Lord Killanin                             |  | <b>Managing director</b><br>Brian Baynes                            |  |
| <b>Unit presidents</b><br>Marcelo A. Gumucio<br><i>Electronic office systems</i>                  | Roy T. Cottier<br><i>Public relations</i>                           | <b>Secretary</b><br>Raju Jayaraman Kerpaya                           | <b>Vice-president</b><br>Jean-Paul Gagnon                       | <b>Managing director</b><br>Patrick J. Hogan                              |  |                                                                     |  |
| George W. Sullivan<br><i>Telecommunications<br/>systems</i>                                       | Robert A. Ferchat<br><i>Finance</i>                                 |                                                                      | <b>Secretary</b><br>David D. Archibald                          | <b>Controller</b><br>Gerry Staunton                                       |  |                                                                     |  |
| <b>Group vice-presidents</b><br>Desmond F. Hudson<br><i>Business communica-<br/>tions systems</i> | Jerry L. Kreiger<br><i>Human resources</i>                          |                                                                      |                                                                 |                                                                           |  |                                                                     |  |
| James L. Donald<br><i>Network systems</i>                                                         | John MacDonald<br><i>Treasurer</i>                                  |                                                                      |                                                                 |                                                                           |  |                                                                     |  |
| Thomas R. Worthy<br><i>Telephone companies</i>                                                    | Edward B. Matthews<br><i>Business systems</i>                       |                                                                      |                                                                 |                                                                           |  |                                                                     |  |
|                                                                                                   | Richard R. Standel, Jr.<br><i>General counsel and<br/>secretary</i> |                                                                      |                                                                 |                                                                           |  |                                                                     |  |



## Networks— for the Intelligent Universe

Several decades ago the philosopher Pierre Teilhard de Chardin wrote that "All round us, tangibly and materially, the thinking envelope of the Earth – the Noosphere – is adding to its internal fibers and tightening its network." Teilhard de Chardin coined the word *Noosphere* (from the Greek root *noos*, meaning mind) to describe his concept of psychic communications channels enmeshing the earth for the immediate exchange of human thought and information.

A communications network consists of two or more points joined together for the transmission of information. Many communications networks may be interconnected to form a universal information distribution system. In its 1978 annual report, Northern Telecom applied Teilhard de Chardin's philosophical concept of the Noosphere to the current evolution of electronic communications technology. The report named the eventual result of this evolution – the emerging international web of electronic communications networks – the *Intelligent Universe*:

*"Information in the form of words, images, voice or numbers enters the networks through integrated multifunction information systems. These systems are based on data terminals, computers, word processing machines, graphics-reproduction equipment, electronic telephones and other, yet-to-be-invented, electronic equipment. The information then travels through the networks where intelligent switching and transmission systems electronically effect and control its flow among users."*

Communications networks fundamentally affect the social order and the progress of individual societies. "As in the past, the nations which have the best communications facilities may have the higher economic growth . . . The corporations which have the best electronic communications may surpass their competition. He who runs the information, runs the show," James Martin, British author, adviser to the British government, communications consultant, and futurist, has written.



**Silicon wafers are inserted into a diffusion furnace. This is a part of the production for large-scale-integrated circuits manufactured by Northern Telecom's Semiconductor Components Group.**

### The public telecommunications network

For most of the past 100 years, there has been virtually only one global telecommunications network – the public telecommunications system. Thousands of telephone companies operate parts of this global network.

The public telecommunications network consists of four basic elements:

- **Terminals** – telephones and many other instruments, which enable individuals to send and receive information;
- **Local loops** – pathways which transmit a message – voice, data or image – from terminals to local switching centers, called central offices, or to other terminals. This connection may be made directly, or through another transmission medium, such as microwave radio. Loops are most frequently pairs of copper wire, but sometimes coaxial cable. In a growing number of new applications they may be glass fiber cables which will offer greater information carrying capacity (called bandwidth).
- **Switches** – routing systems which direct messages throughout a network to their destination.
- **Trunks** – highways of telecommunications networks, usually consisting of copper, or increasingly glass fiber, cable or microwave radio, which connect switches sometimes across town, sometimes across continents.

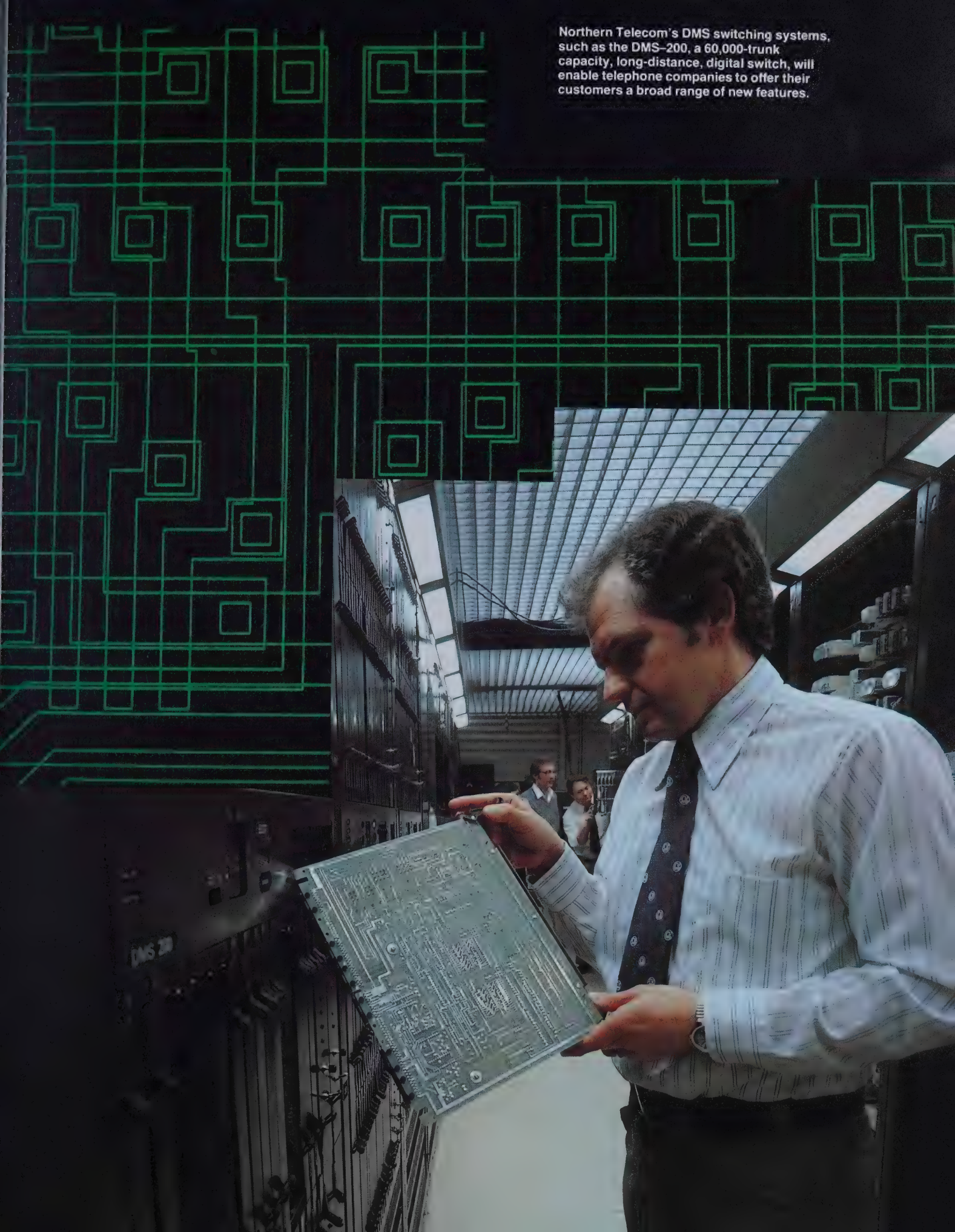
### Private voice and data networks

As early as the 1950s, some organizations were leasing private telephone lines (tie-lines) from the telephone companies to reduce communications costs.

At the beginning of the 1960s, as computer technology advanced, business and other organizations increasingly developed new applications for computers. Driven also by



Northern Telecom's DMS switching systems, such as the DMS-200, a 60,000-trunk capacity, long-distance, digital switch, will enable telephone companies to offer their customers a broad range of new features.





**Printed circuit boards production and wire wrapping for network switching systems. The Network Systems Group is the principal supplier of such switches to the specialized common carriers in the United States.**

the need to curb their rising communications costs, these organizations created their own privately operated data networks within the ubiquitous public telecommunications network in the United States. The trend began slowly. The first private data networks were created for special purposes, such as airline reservations systems.

The growth of distributed-data processing (DDP) in the 1970s, dispersed computer power and storage out of single, large computer centers into smaller decentralized systems generally close to where the data originated. This gave further impetus to the proliferation of private networks to link these distributed systems. The estimated cumulative demand for DDP equipment will be \$37 billion for the 10-year period through 1988, rising from \$2.1 billion annually in 1979 to about \$6 billion per year in 1988.

Today, voice and data networks generally still are distinct operations. One of the major developments of the 1980s will be the integration of these private voice and data networks into single telecommunications systems.

Recognizing the opportunity to create special networks within the public system, that could offer customized and economical long-distance communications services, several companies had by the mid-1970s established so-called specialized common carrier (SCC) networks. They use the telephone companies' (common carriers) local loops and switches to transmit information from their customers' terminals to the SCCs' long-distance (tandem) switches. They then carry the information over their own or leased facilities, and thus generally avoid the public trunk facilities which are usually tarified at higher rates.

### **Growing up with the telephone**

As the principal supplier to Bell Canada, and the other companies in the TransCanada Telephone System (TCTS), Northern Telecom grew up with the evolution of the public telephone network. TCTS is widely recognized as the finest national telecommunications system in the world. During the past decade, Northern Telecom also became a major supplier of telecommunications systems in the U.S. and around the world.

The corporation designs, manufactures and sells virtually the full range of telecommunications equipment. It is the second largest of a few corporations in North America capable of supplying such a broad range of telecommunications products and complete communications networks. It ranks about sixth among such companies in the world.

Taking advantage of the expertise it has gained during the past nearly 100 years of meeting the requirements of the public network, Northern Telecom is now successfully pursuing the vast and growing opportunities in the United States offered by the development of private voice and data networks and the SCCs.



**In January 1981, Northern Telecom announced its first contract in the U.S. to supply, install and maintain an advanced data communications network based on its SL-10 data packet switching system. It was ordered by the U.S. Federal Reserve System.**





### Serving the new markets

Designing and installing communications networks requires the integration of many parts and systems with each other. Individual private networks must work in harmony with the public telecommunications network. This integration is critical. It is a complex function which requires an understanding and mastery of such disciplines as traffic and transmission theory, signalling compatibility, and network structures and operations.

A critical and essential difference between an ad hoc equipment supplier and what Northern Telecom, as a systems supplier, provides is that Northern Telecom can draw on the century of experience it has gained working with Bell Canada, its parent company, designing, integrating, installing, operating and maintaining all types and elements of complex networks.

This experience gave birth to a major, new, digital communications system in June 1973 when the corporation conceived, and its research and development subsidiary, Bell-Northern Research, began to develop, the SL-1.

Following a field trial begun in early 1975, the SL-1 was placed into commercial service in December 1975. In December 1980, only five years after its introduction, there were more than 2,200 SL-1s in service in Canada, the United States and 28 other countries. By early 1981, SL-1 was serving more than one million telephone lines.

The SL-1, in its most basic role, is a private branch exchange (PBX), which controls internal networks. It serves as the switching system for calls within the building in which it is installed. Acting similarly to a telephone company's central office switching system, the SL-1 also connects calls to trunk lines.

Even in its internal network role, a PBX performs a complex and formidable number of tasks, depending on the capabilities given to it, its size, and a customer's needs.

Advanced systems, such as the SL-1, may offer as many as 150 features or more. Some examples are: auto-

matic route selection – determining the least expensive way to route long-distance calls; call detail recording – providing information for billing purposes for each telephone set enabling a company to allocate charges to each user and analyze use of its network; call forwarding – automatically relaying incoming calls to another telephone set; automatic call distribution – routing of an incoming call to the next available telephone.

Another special feature of the SL-1 is the system's most visible part to the user – the telephone set. In previous systems, feature access to the user was limited due to the complexity of dialing codes or other procedures that had to be followed to take advantage of them. The special electronic telephone set designed for the SL-1 user makes it possible to access features by the simple press of a button (key) dedicated to that feature. The SL-1 telephone set is indicative of a fundamental concern Northern Telecom has in the design of all its products – the human interface. All products and systems should be "friendly", encouraging easy and convenient use.

From the outset, Northern Telecom planned to make the SL-1 far more than a PBX, and therefore has always referred to it as a digital business communications system. The SL-1 has evolved continually since its 1975 introduction. Northern Telecom initially invested about \$11 million in research and development to bring the SL-1 to the market. This amount is estimated to be only about one-quarter, or one-fifth, of the total that has, and will be, spent to add capabilities and take full advantage of technological developments.

In 1977, Northern Telecom extended the SL-1's role as an internal network switching system by adding remote peripheral equipment. This enabled a single SL-1 system to serve several remote locations linked to it by digital transmission through cable or microwave radio.

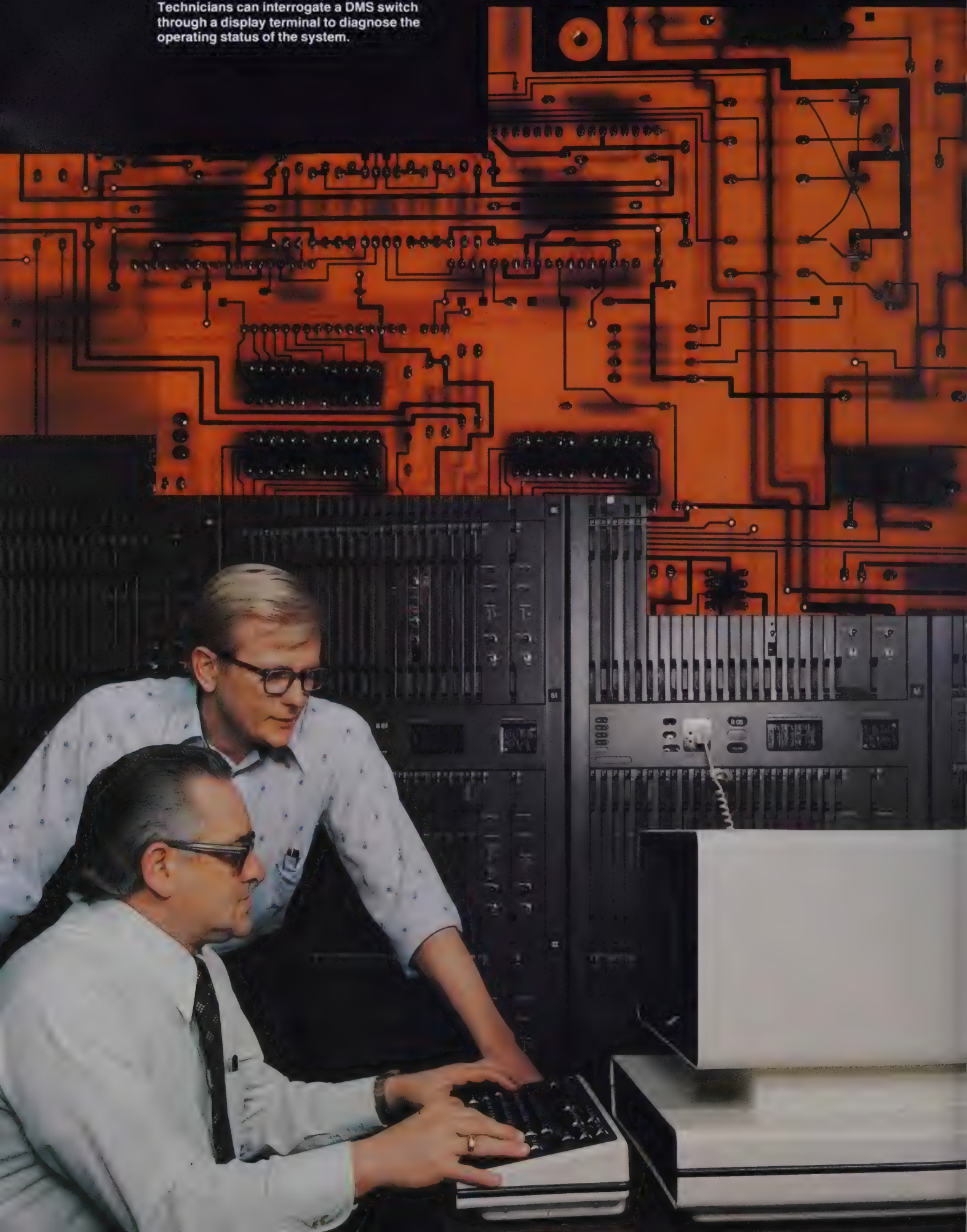
### The Electronic Switched Network

In 1981 the SL-1's capabilities will be extended to control a continent-wide private telecommunications network for voice and data. In September 1980, Northern Telecom announced the Electronic Switched Network (ESN). ESN will provide more efficient and cost-effective communications for a network consisting of two or more locations in a metropolitan area to as many as 100 locations scattered across a continent.

A potential ESN user must have in its network at least one SL-1 equipped with the special ESN software to serve as the network's central control switch. Locations elsewhere in the network may be served by other PBXs. Historically, private networks have depended on access codes



Technicians can interrogate a DMS switch through a display terminal to diagnose the operating status of the system.





dialed in sequence by the user who is choosing among various possible ways of placing a call. If the route chosen is busy, the user will either have to keep trying to place the call that way, choose another possible route, or more frequently will elect to go off the private network and use the public network's more expensive direct distance dialing.

ESN obviates the need for this and offers improved transmission quality. The user dials the number of the location being called and ESN takes over, choosing the most effective and least-cost route for the call. If the call cannot be immediately completed, ESN puts the caller in line and notifies the caller when the call can be completed. The touch of a key then places the call again.

Northern Telecom, itself, will be the first company to use the ESN. The corporation expects its least-cost-routing features alone to reduce corporate long-distance charges by at least 25 percent, or more than \$1 million a year.

An important element of the ESN is its unique Communications Management Center (CMC). Initially, Northern Telecom's consultants will design for a customer the most efficient network possible based on the available information about historical and expected communications volume and use. However, this use constantly changes, particularly when a new network alters previous calling habits.

The CMC will collect and analyze detailed, current and accurate data on the use of the network. This will make it possible to match as required the design of the network to an organization's current needs, and to bill individual network users for their calls.

As a sophisticated private network system, ESN extends many of the capabilities of public telecommunications networks to private networks. Obviously, compared to a basic PBX, a private network requires greater planning and coordination. Northern Telecom will provide all the network design, engineering and management service to establish such a system. Through its affiliation with Bell Canada and BNR, and the technological expertise of its own people, Northern Telecom is in a unique position to provide the necessary nationwide support and technical expertise.



**Data test systems produced by Spectron can display data as it is transmitted and received so that hardware or software problems may be identified and analyzed.**

### **Voice and data in one system**

In 1980, Northern Telecom supplied its first commercial SL-1 providing integrated, simultaneous voice and data switching capability for such applications as word-processing, time-sharing, distributed-data processing and electronic messaging.

This integrated, voice-and-data capability is achieved by the simple addition of a special microprocessor-controlled Add-on Data Module (ADM) to an SL-1 telephone set and of a data line card to the PBX. This enables an SL-1 to handle voice and high-speed data communications simultaneously. The data can be transmitted in digital form between computers at speeds of up to 9,600 bits per second for intra-office transmission. The ADM avoids the need for any special equipment, such as modems or acoustic couplers, for intra-office data communications and permits the sharing of modems and trunks for external transmission. No special wiring or programming is required to extend the SL-1's features to data communications.

### **Packets of data**

While the SL-1 was under development in 1974, Bell Canada, BNR and Northern Telecom were also working on a system to serve as the control node for public and private data networks. The result of BNR's work, derived from the computer processor and memory developed and proven for the SL-1, was the SL-10 data packet switching system.

Data is often sent on a telephone line dedicated (held open) to the user for the duration of the transmission in the same way as for a regular telephone voice call. This method, called line or circuit switching, is efficient for high volume, continuous data transmission. However, in a growing number of applications, such as credit card verification, data is transmitted intermittently in small bursts. Dedicated lines for such use are inefficient and therefore costly.

In packet switching, data is transmitted in blocks, called packets. Each packet is assigned an address; the process is much like the high-speed mailing of letters. The



**SL-10, the backbone of the TransCanada Telephone System's Datapac public data packet switching network, has also been sold to customers in West Germany, Switzerland, the U.S., and Belgium.**



**Completion of splicing on Northern Telecom's LD-4, the first successful high-capacity, digital, long-haul transmission cable system in the world. Introduced in 1974, LD-4 links Toronto, Ottawa, and Montreal in the Bell Canada network.**

switching system stores, addresses, interprets the language or protocol of the data and then routes the data packets on their way in a standard format. This is the role of the SL-10, which uses the internationally recognized standard protocol called X.25. At the destination, the system converts the standard data format to one that is recognized by the receiving terminal. This enables different computers or computer networks to "talk" with each other. If the computers already use X.25, as is increasingly the case, no protocol conversions are necessary.

In a packet switching network many users, in effect, share the same telephone lines. The SL-10s in the network interweave the packets of data, and efficiently fill in the empty spaces that would otherwise exist between data bursts. Users are charged only for each packet of data sent, rather than for the full cost of a dedicated line.

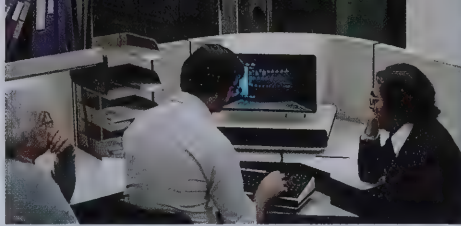
The design criteria set for the SL-10 posed an impressive challenge. A packet data network would have to provide advanced transmission features which would match the high reliability standards already established by the telecommunications industry. Additional requirements included end-to-end transmission error control and extensive network administration. Switching equipment in such a network would have to be economically configurable to handle wide ranges of traffic, from a few dozen subscribers in a particular location to a few thousand in another. Other important characteristics of a packet data network include the need to collect detailed accounting records, to provide service and service changes on demand.

In June 1977, the Computer Communications Group of the TransCanada Telephone System became the first user of SL-10. It offered a public data packet switching network called Datapac, built on the SL-10. By the end of 1980 Datapac had grown to 15 SL-10 nodes in nine cities across Canada.

In July 1980, Northern Telecom announced the successful completion and start-up of its first major packet switching network outside Canada. The network, which initially consists of some 19 SL-10 switches, was sold to the Deutsche Bundespost, the telecommunications authority of West Germany. The system, called DATEX-P, will provide packet switching services throughout the country and will be able to connect with other international networks such as Datapac in Canada and Transpac in France.

In January 1981, Northern Telecom signed its first contract for an SL-10 network in the United States. The SL-10s will provide the U.S. Federal Reserve System with its own packet switching network to link operations in 14 locations.





Software, the control language for computer-controlled systems such as DMS and the SL-1, is written and tested at Bell-Northern Research.

Two other major international customers have chosen Northern Telecom's SL-10 for their private data networks. They are the Société Générale de Banque, the largest bank in Belgium, and the Swiss telecommunications authority. The Société Générale de Banque initially purchased three SL-10s to provide data communications in the cities of Brussels, Ghent and Antwerp. In 1980, the bank purchased three more SL-10s, doubling its network. The Swiss telecommunications authority has scheduled the installation of four SL-10s in the first half of 1981.

### **The Network Systems Group**

As the Intelligent Universe evolves, it will become evident that we have only begun to realize the combined potential of public communications networks and the growth within them of private voice and data networks and specialized common carriers. To serve the rapidly developing markets for such networks in the U.S., Northern Telecom formed a Network Systems Group. This concentrates network development, design, marketing and service responsibilities in one organization. The nucleus of the group consists of operations which were those of a company called Danray, Inc., acquired by Northern Telecom in January 1978.

Network Systems is the principal supplier of switching systems to the specialized common carriers. SCCs have bought nearly 120 systems since Danray's first sale to MCI Telecommunications Corporation in 1975. The systems, called Computerized Tandem Switching Systems (CTSS), direct long-distance communications in the SCCs' networks.

The Network Systems Group can draw on the total resources of Northern Telecom, Bell Canada, and Bell-Northern Research to create and support large and efficient voice and data networks. In addition to supplying networks for SCCs, the group has prime responsibility within Northern Telecom for private networks such as the Electronic Switched Network and very large PBX systems.

The group offers a private network version of CTSS and a sophisticated private telecommunications network called the Universal Switched Network (USN). The group's CMX 8000 computerized master exchange is a sophisticated PBX, with network voice and data capabilities. This PBX is larger than the switching systems operated by many of the telephone companies in the U.S.

### **The future is . . .**

Shortly after Alexander Graham Bell invented the telephone, a person in London, England observed that "the telephone may be appropriate for our American cousins, but not here because we have an adequate supply of messenger boys." Obviously, it can be dangerous to attempt crystal ball gazing, but at least some trends appear clearly defined to most contemporary communications experts.

Despite the seemingly pervasive role that the computer already plays in our lives, only about 10 percent of communications is now in the form of data. The remaining 90 percent is still voice communications. It is widely recognized that data communications will experience a manifold increase in the unfolding Intelligent Universe. In the 1990s, data communications is expected to exceed voice. A major U.S. market research company expects that in the five-year period 1979-1984 the U.S. market will increase:

- 130 percent for computer terminals, from 3.3 million units to 7.6 million
- 1,200 percent for desktop computers, from 400,000 to 5.2 million
- 140 percent for computers, from 500,000 to 1.2 million, and
- 1,900 percent for communicating word processors, from only 25,000 to half-a-million.

Add to this the growing use of video-conferencing, and communicating facsimile systems, and telex. Add viewdata systems for homes and offices which can turn a television set into an interactive data terminal for relatively easy access to all manner of data bases. And add the introduction of a broad range of new business services such as electronic mail, store-and-forward voice and data messaging, electronic funds transfer and credit verification.

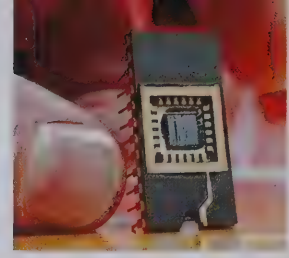
### **The Intelligent Universe**

The public telecommunications network was originally designed and built for voice. That is obviously no longer adequate or efficient since the amount of data, video and image signals is constantly increasing. Accordingly, one of the most significant developments for public and private telecommunications networks will be what Northern Telecom announced in 1976 as the advent of the Digital World - the concept that in future all telecommunications will be based on digital technology.

In digital technology all messages are in the form of electronic on-and-off pulses. Digital brings order to telecommunications networks. Digital makes it possible for integrated systems in the network, office, home or factory to transmit, switch, store and analyze information of all kinds in the language of electronic pulses. Digital is thus the technological basis for the Intelligent Universe.



**A custom-designed large-scale-integrated (LSI) circuit designed and manufactured at Northern Telecom's semiconductor facilities in Ottawa, Ontario.**



Northern Telecom has already successfully introduced an array of digital products. These include the SL-1 and SL-10, the DRS-8 digital radio system, DE-3 and DE-4 channel banks for multiplexing and conversion of analog and digital signals, LD-1 and LD-4 digital trunk systems, and the DMS family of digital switching and transmission systems.

Northern Telecom will continue to enhance the capabilities of its digital products, in a way similar to how it evolved the SL-1. Gradually, the predominantly analog network in North America, and around the globe, will become fully digital. The enormous size of this network means that the process will likely take decades.

The addition of software-based features will expand the capabilities of the DMS family. The power of the DMS switching systems will enable telephone companies to offer their customers, through the public telecommunications network, a range of new services such as store-and-forward messaging and improved data-handling capabilities. Northern Telecom will also modify or enhance DMS for use in private networks such as the Electronic Switched Network and for large PBX requirements.

While advanced PBX-type systems like SL-1 will continue to be the control centers for future private voice and data networks for many years, other systems are being developed to work with, and alongside, the PBX. Northern Telecom is currently actively developing local area networks (LANs) for voice and data, which are expected to develop into a rapid growth area in the 1980s.

In LANs, terminals are connected to a broadband transmission medium. No central controller such as a PBX is necessary within the LAN. Each terminal has built-in intelligence which enables it to enter information into the transmission medium in packet format addressed for a receiving terminal. Each terminal also monitors all the information packets as they pass by it on the LAN. Whenever a terminal – which may, for example, be a computer, a telephone, or a word processor – recognizes a packet of information addressed to it, it takes it from the network.

In many applications, particularly for linking different LANs into broader networks, PBXs such as the SL-1 will continue to play a vital role. The cable in LANs may be co-

axial copper cable or an optoelectronic system using glass fibers. Optoelectronics, which offers greater information transmission capacity at potentially lower cost than comparable copper cables, is expected to be an exciting market in the 1980s. Forecasters predict the market will grow from less than \$100 million in 1979 to about \$2 billion by 1990.

In 1980, Northern Telecom Canada won a \$22 million contract from Saskatchewan Telecommunications to provide a 3,200 kilometer optical fiber system. It will be the backbone of the longest, digital, integrated telecommunications network in the world. It will provide voice, data and video (cable television) services.

Northern Telecom is supplying the optoelectronic system for a similar network for the Manitoba Telephone Company in Elie, Manitoba. Several trials have been underway in the Bell Canada network for a few years.

An expanding variety of terminals will provide access to networks of the future. They will have varying degrees of built-in intelligence made possible by the rapid advances in semiconductors and software. These are the basic technologies of the Intelligent Universe.

An example of such terminals is Northern Telecom's new Displayphone, announced early in 1981. This terminal combines a telephone handset, video display screen and a keyboard with programmed intelligence to make it an integrated voice, data and message terminal. It can be used as a telephone and to access data bases. It can transmit and receive messages for an electronic mail system, serve as an electronic appointments calendar and perform many other functions. Displayphone, designed to be friendly to the user, requires no special training or codes.

Northern Telecom's electronic office systems organization, in addition to marketing Displayphone, is evolving its data processing products. It is directing the development of an array of other sophisticated systems which will become integral parts of the Intelligent Universe.

Teilhard de Chardin described a web of intelligence surrounding the earth which provides easy, immediate and universal access to knowledge. The technologies to realize this Intelligent Universe are now known to us. We have only begun to realize the potential of public and private telecommunications networks and these will continue to undergo enormous change and growth in the decade ahead. Progress in telecommunications will permit us to reap the benefits of progress being made across a spectrum of other technologies.

We are all affected by telecommunications; we now have the opportunity to be participants in its evolution.



A silicon wafer (top) from which custom-designed LSIs are cut. Custom LSIs are a major element in Northern Telecom digital switching systems.





## Financial review

The net loss for 1980 was \$185.2 million (\$5.48 per share) compared with net earnings of \$113.5 million (\$3.70 per share) in 1979, and \$100.7 million (\$3.55 per share) in 1978. The fourth quarter 1980 loss of \$214.9 million (\$6.32 per share), included extraordinary items of \$163.8 million (\$4.85 per share) relating to the electronic office systems business (these would not be considered extraordinary items under U.S. generally accepted accounting principles). In addition to the extraordinary items reported for the fourth quarter 1980, the quarter was also negatively affected by approximately \$56 million additional charges to cost of revenues, principally relating to the electronic office systems business.

### Revenues exceed \$2 billion

On the strength of widespread market acceptance of its digital switching and transmission systems, Northern Telecom achieved in 1980 its eighth consecutive annual increase in total revenues. The corporation's total revenues amounted to \$2.055 billion in 1980, compared with \$1.901 billion in 1979 and \$1.505 billion in 1978. The increase in revenues during these three years has been mainly the result of volume growth as opposed to price increases.

### Telecommunications equipment revenues up 16 percent

Telecommunications equipment revenues rose 16 percent in 1980 to \$1.751 billion from \$1.505 billion in 1979; revenues in 1978 were \$1.131 billion.

The greatest part of this growth occurred in sales of central office telephone switching systems. Sales of Northern Telecom's DMS (Digital Multiplex System) switches rose from \$36 million in 1978 and \$127 million in 1979, to \$269 million in 1980, more than offsetting a decline in the sales of older analog switching products. The growth in 1980 came mainly from increased production and shipments of the DMS-100 Family switches to customers throughout the United States and Canada.

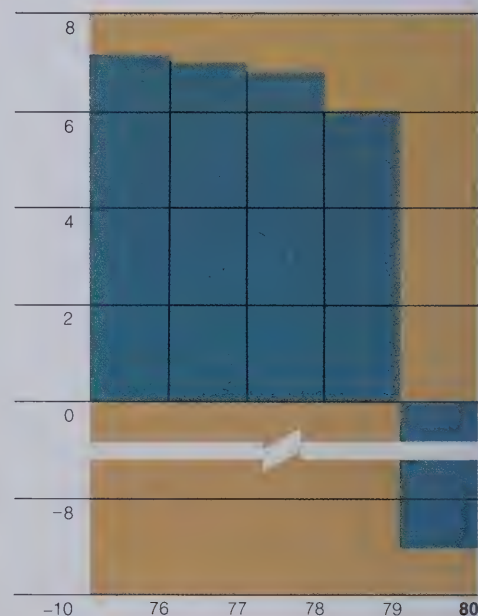
Sales of subscriber apparatus and business communications systems rose in 1980 by 18 percent compared with 40 percent in 1979, and have increased at a compound annual rate of 22.8 percent since the introduction of the SL-1 digital business communications system in 1975. The continuing growth is attributable to increasing sales of the SL-1, the SL-10 data packet switching system, and a number of other products introduced over the past several years.

Sales of transmission products were up 22 percent in 1980, to a level nearly double that of three years ago. Significantly higher sales in the U.S., acceptance of products introduced during the past several years – such as the DMS-1 digital subscriber carrier system, digital channel banks and digital microwave radio – and increased sales of data transmission test equipment by the Spectron division, accounted for most of the increase.

Capital expenditures  
(\$ millions)



Net earnings per revenue dollar  
(cents)





Wire and cable and outside plant product sales declined five percent in 1980. They were particularly affected by the economic recession which reduced telecommunications demand. Power cable sales declined as a result of the phasing out of this operation starting early in 1980 following the sale of the assets of this business.

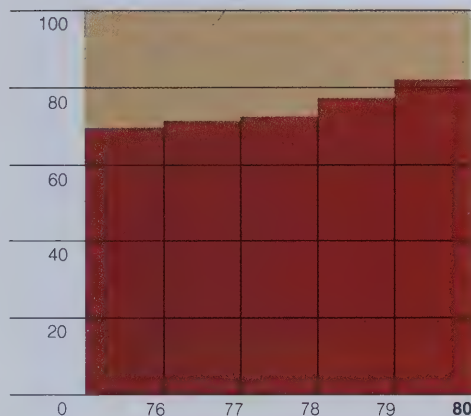
The poor economic climate in 1980 constrained sales of many product lines, affecting some areas more than others. At yearend 1980, it appeared that historically high interest rates would cause a continuation of these conditions, dampening sales growth for at least the first part of 1981.

Sales to Bell Canada, its telephone subsidiary and associated companies, in 1980 were \$722.2 million, compared with \$695.9 million in 1979 and \$621.9 million in 1978.

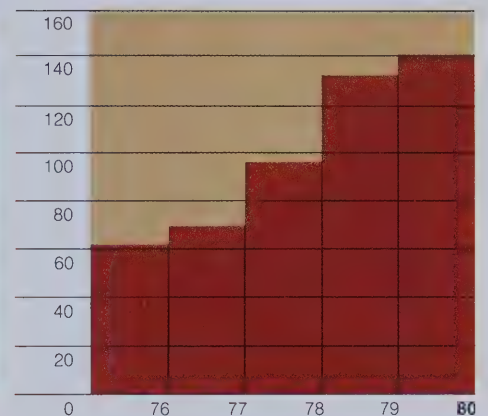
Although Bell Canada's capital expenditures in 1980 were about 16 percent higher than in 1979, most of this increase was devoted to expenditures for buildings and other non-telecommunications equipment expenditures. Spending on telecommunications equipment by Bell Canada and other Canadian telephone companies in 1980 was affected by the poor performance of the Canadian economy. It is expected that Bell Canada's purchasing of our equipment, particularly central office switching, will increase in 1981.

While Bell Canada continues to be Northern Telecom's largest customer, it again accounted for a declining percentage of total revenues, 35.2 percent in 1980 compared with 36.6 percent in 1979 and 41.3 percent in 1978.

**Proprietary products as percentage of manufacturing revenues**  
(percent)



**Research and development net expenditures**  
(\$ millions)



### **EOS revenues drop**

Electronic office systems (EOS) revenues – the operations of the acquired Sycor and Data 100 companies – dropped sharply in 1980 to \$259 million from \$349.8 million in 1979.

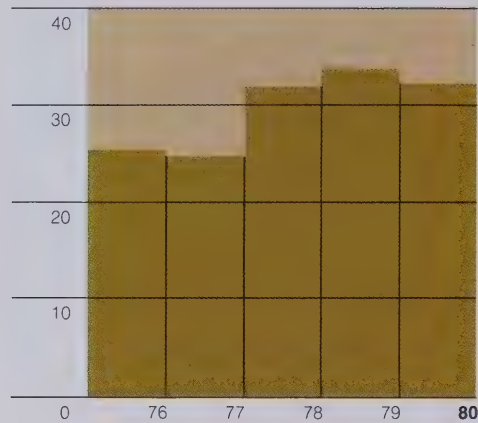
In the second quarter 1980, Northern Telecom discontinued the sales to third parties of equipment which is leased to customers on operating leases. Such sales to third parties each quarter dated back to the practices of Sycor and Data 100 before their acquisition by Northern Telecom.

Virtually no lease sales were made in the second quarter 1980, and none were made during the remainder of the year. The intent was to permit the lease base to grow in anticipation of potential greater future revenues and earnings at the sacrifice of the immediate cash flow and earnings that might have been recorded from lease sales. However, during the second half of 1980, revenues generated from the lease base continued to decline in part because of lower revenues from older equipment.

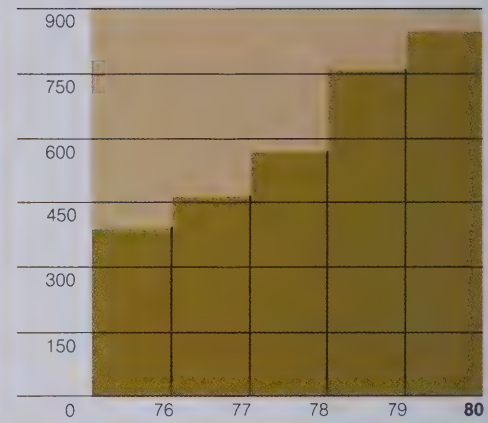
Measures taken to integrate the businesses formerly conducted by Data 100 and Sycor contributed significantly to the decline in EOS revenues, including those from the lease base. These measures were taken to restruc-



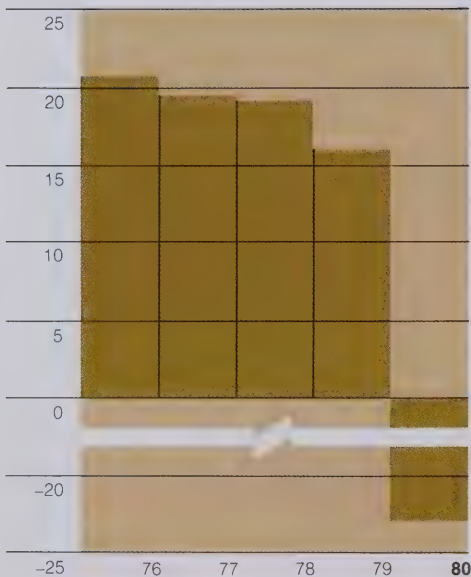
**Number of employees**  
(thousands)



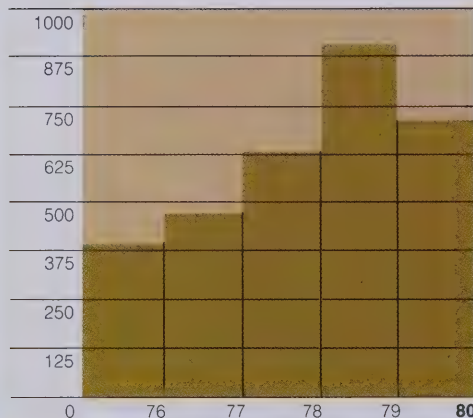
**Total compensation**  
(\$ millions)



**Return on shareholders' equity**  
(percent)



**Shareholders' equity**  
(\$ millions)



ture the business, streamline its organization and to improve its product lines. In particular, these included the closing of two manufacturing plants (a third closure was announced in January 1981), and the movement of production lines of key products to other facilities. These actions disrupted the production of new systems and the refurbishing of equipment in the lease base and brought about a further deterioration in the business.

In 1981, Northern Telecom will introduce a number of new products and enhancements of existing products for the electronic office systems market. However, it is anticipated that the performance of this sector will be weak until the restructuring activity is completed in 1981.

### Geographic revenue distribution

On a geographic basis (the point of origin of sales), total revenues of the corporation's U.S. operations were \$807 million, or 39.3 percent of consolidated revenues, compared with \$739.6 million, or 38.9 percent in 1979, and \$447.1 million, or 29.7 percent in 1978. Canadian operations achieved revenues of \$1.084 billion in 1980, compared with \$1.001 billion in 1979, or 52.7 percent in both years, and \$1.008 billion (including \$162.8 million from the discontinued distribution business), or 67 percent in 1978.

Northern Telecom's operations outside of North America reported revenues of \$163.6 million, or eight percent of the total in 1980, compared with \$160.1 million, or 8.4 percent in 1979 and \$49.6 million, or 3.3 percent in 1978.

### **Costs rise substantially**

The percentage increase in cost of revenues in 1980 – 19 percent to \$1.55 billion from \$1.304 billion in 1979 (\$1.032 billion in 1978) – was significantly higher than the revenue growth achieved. Gross margins declined to 24.5 percent in 1980 from 31.4 percent in both 1979 and 1978. Selling, general and administrative expenses rose substantially in 1980 to \$341.4 million, from \$280 million in 1979 and \$228.9 million in 1978.

There were a number of reasons for these unusually large cost increases. As indicated in our previous financial reports to shareholders, the orders for Northern Telecom's new DMS digital switching systems were substantially greater than expected, requiring a rapid and very sizable build-up in production capacity. This increase required the addition of new production facilities, the conversion of others from manufacturing older products to the new switches, and significant preproduction and start-up costs, placing considerable pressure on the manufacturing margins.

The start-up expenses for DMS were felt most keenly in 1980. Difficulties in obtaining sufficient supplies of quality components, and production problems experienced in the manufacturing of these new systems, delayed expected shipments and improvements in manufacturing efficiencies, adversely affecting operating results. At the end of 1980, improvement in these areas was being achieved and it is expected that the DMS revenue will increase substantially for 1981 and that the product line is projected to be profitable for the first time.

Also accounting for the disproportionate increase in costs were a number of provisions and expenses incurred in 1980. These included the costs expensed relating to the closing of the EOS manufacturing plants in Ann Arbor, Michigan; Goldsboro, North Carolina and Cork, Eire, and the costs of terminating employees. Employment in the EOS organization was reduced in 1980 by 1,400 to about 4,700 people; a further planned reduction of 600 employees was announced in December 1980.

Provision was made to be able to repurchase from third parties and possibly remove from the market certain older data equipment to aid in the marketing of newer EOS products. Also, in view of an increased amount of uncollectible receivables related to the lease base, the corporation deemed it appropriate to increase the provision for uncollectible accounts.

The corporation's normal inventory evaluation process is to reduce to scrap value inventories not expected to be sold in the next fiscal year. The deterioration of the electronic office systems business and the effects of the poor business climate on our telecommunications business, accordingly required an unusually high reduction of inventory values.

The impact on the sales of a broad spectrum of products caused by the economic recession meant lower than planned manufacturing levels, resulting in some production costs not being offset by revenues, further aggravating the decline in margins.

### **The R&D commitment**

Net research and development expenses rose in line with the increase in revenues. Northern Telecom believes it must maintain a high and consistent level of R&D spending to remain in the forefront of development in the high-technology industries in which it competes. Net R&D spending in 1980 was \$140.9 million, or 6.9 percent of total revenues, compared with \$132.6 million, or 7 percent of total revenues in 1979, and \$97.8 million, or 6.5 percent of total revenues in 1978.

The largest factor in Northern Telecom's current R&D spending has been development work on its digital switching and transmission products. The basic development work on these systems has now been completed. This will enable increasing amounts of funds to be devoted to evolving the capabilities of these digital systems to provide new features to customers and to serve new markets.

### **Operating earnings**

The unusual and high expenses incurred in 1980 together with the provisions made and reduced operating profits from the corporation's established and successful product lines, resulted in a marginal profit from operations in 1980. This profit of \$21.7 million, or 1.1 percent of total revenues, compares with earnings from operations in 1979 of \$183.8 million, and \$145.7 million in 1978, or 9.7 percent of total revenues in both years.

Operating losses of \$86.7 million occurred in the electronic office systems business, compared with operating earnings of \$26 million in 1979, and \$30 million in 1978 from the dates of acquisition. Operating earnings in the telecommunications business decreased to \$187.4 million, compared with \$234.5 million in 1979, and \$180.9 million in 1978.



Operating earnings for these business segments do not include general corporate expenses. These corporate expenses rose in 1980 to \$82.5 million, from \$78.4 million in 1979, and \$74 million in 1978, reflecting higher salary and benefits costs and escalating interest expenses.

On a geographic basis, operating earnings in Canada were \$253.5 million in 1980, compared with \$239.4 million in 1979, and \$223.5 million in 1978, and were derived mainly from sales of telecommunications equipment.

The U.S. operations, which were most affected by the losses in the EOS business and the costs of production start-up and marketing of the DMS switching systems, recorded an operating loss of \$37.1 million in 1980, compared with a profit of \$131.9 million in 1979, and \$86.8 million in 1978. Operations outside of North America reported operating earnings of \$26.9 million in 1980, compared with \$24.8 million in 1979 and \$7.2 million in 1978.

#### **Higher borrowings and interest rates**

To finance its business, increased inventories, accounts receivable, and greater capital expenditures in 1980, Northern Telecom increased its amounts of outstanding long-term debt and commercial paper borrowing. This, and escalating interest rates in 1980, meant a rise in interest expense to \$44.9 million, compared with \$38.2 million in 1979, and \$17.1 million in 1978.

#### **Lower income taxes**

The corporation's tax provision was \$7.5 million in 1980, compared with \$35.5 million in 1979, and \$49.9 million in 1978. The decline in 1980 compared with 1979 was due principally to losses in the U.S. operations and the difference between statutory Canadian rates and those rates applicable to the profits of foreign operations. The decline in 1979 compared with 1978 was primarily due to the difference between statutory Canadian rates and those rates applicable to the profits of foreign (other than U.S.) operations.

During 1980, the corporation recorded tax benefits of \$32.6 million on a portion of the losses incurred in 1980 by U.S. operations. In the opinion of management, sufficient taxable income will be earned in 1981 to use these benefits in that year. An additional \$150 million of losses in U.S. and other operations (primarily incurred in 1980) is available to offset taxes payable in future periods, provided sufficient taxable income is earned.

#### **Writeoff**

When Northern Telecom acquired Sycor and Data 100, the excess of the total price paid over the fair value of the balance sheet assets (the goodwill) was justified on the basis that the fair value of the assets did not include intangibles such as the projected income from leases then outstanding. At the time of the purchase, the income projected from leases owned by the companies exceeded the goodwill paid.

In 1980, the operations of EOS deteriorated, particularly in the latter half of the year, and actual and projected lease revenue declined despite efforts to expand it. As a result of a review of this business completed in December 1980, the Board of Directors approved management's recommendation to write off as an extraordinary item the entire amount of unamortized goodwill

of these companies, and the value of their technology investment and of the former Danray, Inc. This charge amounted to \$106.4 million.

Other provisions totalling about \$113 million were made in the fourth quarter 1980 relating to the costs of plant closings and employee terminations, inventory writedowns, and possible equipment repurchase and uncollectible receivables. Of the \$113 million, \$57.4 million qualified as extraordinary items related to the discontinuance of certain elements of the EOS business. This amount and the goodwill and technology investment writeoff would not be reported as extraordinary items under U.S. generally accepted accounting principles. The remaining approximately \$56 million of other provisions was recorded as operating expenses.

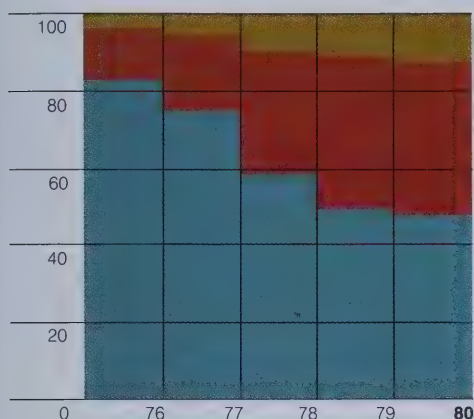
#### **The bottom line**

The result of the extraordinary items and the small operating profit in 1980 was a consolidated net loss of \$185.2 million, or \$5.48 per share, compared with net earnings of \$113.5 million, or \$3.70 per share in 1979, and \$100.7 million, or \$3.55 per share in 1978.

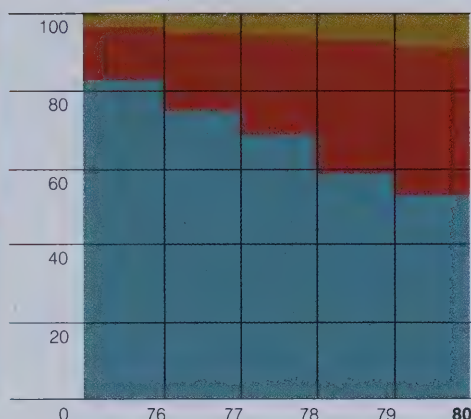
#### **Liquidity and capital resources**

While the working capital position of the corporation has grown from \$337 million at December 31, 1977 to \$452.7 million at the end of 1980, the current ratio has declined from 2.76:1 at December 31, 1977 to 1.76:1 at December 31, 1980. These changes resulted from the continuing growth in the corporation's business and its entry into new markets in the U.S. The corporation moved from being in a net investor position in 1977 to the corporation being a substantial net borrower at December 31, 1980. Fixed assets had increased from \$186 million to \$498 million.

**Total manufacturing revenues  
by geographic area  
(percent)**



**Telecommunications revenues  
by geographic area  
(percent)**



An increasing portion of capital in the past three years has been provided by debt sources. During this period the corporation's total debt as a percentage of total capitalization has moved from 13.4 percent at December 31, 1977 to 35.8 percent at the end of 1980. The percentage of short-term debt to total debt has decreased during the same period from 33.6 percent to 28.7 percent.

The flow of funds from operations in 1980 was \$48.7 million, compared with \$206.4 million in 1979, and \$176.2 million in 1978.

In September 1979, Northern Telecom successfully raised \$198 million through a public offering in Canada and the U.S. of two million common shares, and the coincident issue of an additional two million shares to Bell Canada.

Under the corporation's dividend re-investment and stock purchase plan, introduced at the beginning of 1980, \$29.6 million of dividends and additional cash was raised in purchasing Northern Telecom's common shares. This included shares purchased by the corporation's majority shareholder, Bell Canada.

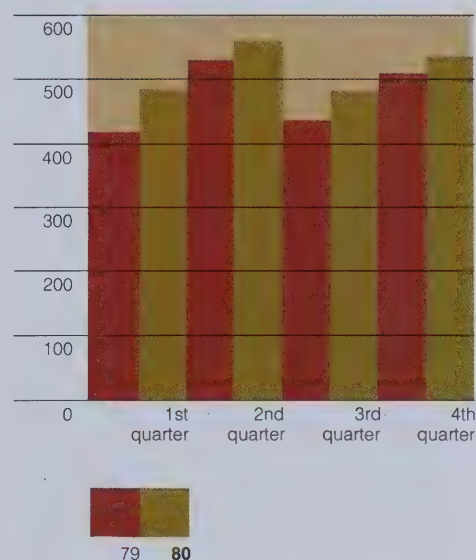
At yearend 1980, there was \$166.1 million of long-term indebtedness outstanding under agreements with various banks, an increase of \$40.9 million during 1980.

In September 1980, US\$75 million (\$89.5 million) of 12.25 percent 10-year notes were sold to the U.S. public market. In December 1980, US\$25 million (\$29.8 million) of floating rate notes were sold to a U.S. financial institution.

The corporation has also used the commercial paper market from time-to-time when interest rates in such markets were considered advantageous.

During the past three years, Northern Telecom has spent about \$526 million on new plants and equipment and additions to the EOS lease base. The corporation believes that it generally has sufficient plant capacity to support its planned rate of growth. As a result, plant expenditures will be lower in

**Quarterly highlights/revenues  
(\$ millions)**





1981 than in 1980. The corporation has planned capital expenditures of \$188.7 million in 1981, including lease base additions.

The need for capital in 1981 will be met primarily from internally generated funds, including the receipt in January 1981 of a special dividend of \$59.7 million from one of its non-consolidated finance subsidiaries, the receipt in February 1981 of \$55 million from the sale of the corporation's investment in the common shares of Intersil, Inc., and from the Shareholder Dividend Reinvestment and Stock Purchase Plan.

The corporation believes that, to the extent required, its unused short term operating bank lines and the availability of commercial paper borrowings, will provide adequate cash resources in 1981.

### Record order backlog

Northern Telecom's order backlog at the end of 1980 for the first time exceeded \$1 billion. Orders on hand at year end were \$1.004 billion, 14.9 percent higher than the \$874 million of orders on hand at the end of 1979, and 58 percent higher than the backlog of \$635.3 million at the end of 1978. Orders for digital switching systems were the largest part of the backlog at the end of 1980.

### Market price of stock

Northern Telecom's shares are listed on the Montreal, Toronto and Vancouver stock exchanges and on the New York Stock Exchange. The following table sets out the high and low sale prices of the shares on the Montreal and Toronto stock exchanges, taken together, and on the New York Stock Exchange as reported on the composite tape in the United States:

|      |                          | Montreal and Toronto<br>(Canadian dollars) |     | New York and composite tape<br>(U.S. dollars) |     |
|------|--------------------------|--------------------------------------------|-----|-----------------------------------------------|-----|
|      |                          | High                                       | Low | High                                          | Low |
| 1979 | First Quarter . . . . .  | 48½                                        | 36  | 41⅞                                           | 30⅞ |
|      | Second Quarter . . . . . | 48⅞                                        | 43⅞ | 42⅜                                           | 37¼ |
|      | Third Quarter . . . . .  | 51½                                        | 41¼ | 44½                                           | 35⅝ |
|      | Fourth Quarter . . . . . | 54½                                        | 43  | 46⅞                                           | 37  |
| 1980 | First Quarter . . . . .  | 55½                                        | 37¼ | 48                                            | 31⅞ |
|      | Second Quarter . . . . . | 41½                                        | 38⅞ | 36                                            | 32⅝ |
|      | Third Quarter . . . . .  | 45½                                        | 36½ | 38½                                           | 32  |
|      | Fourth Quarter . . . . . | 41½                                        | 29¾ | 35¾                                           | 25⅞ |

Bell Canada owned approximately 54.7 percent of the shares at February 9, 1981. The approximate number of shareholders of the remaining 45.3 percent of the shares as at February 9, 1981 was 13,921.

During the years ended December 31, 1980 and 1979, Northern Telecom paid or declared dividends on its shares as follows:

|                          | 1980   | 1979   |
|--------------------------|--------|--------|
| First Quarter . . . . .  | \$0.25 | \$0.20 |
| Second Quarter . . . . . | 0.25   | 0.20   |
| Third Quarter . . . . .  | 0.25   | 0.20   |
| Fourth Quarter . . . . . | 0.25   | 0.25   |
| Total . . . . .          | \$1.00 | \$0.85 |

### Dividends

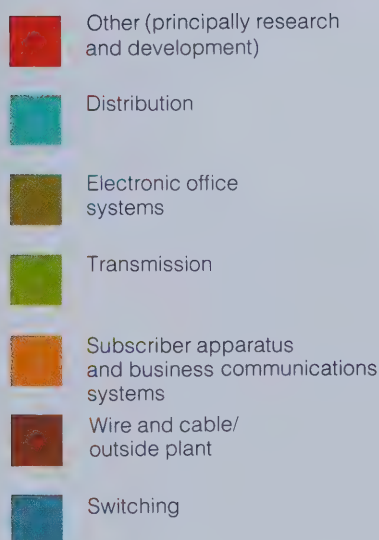
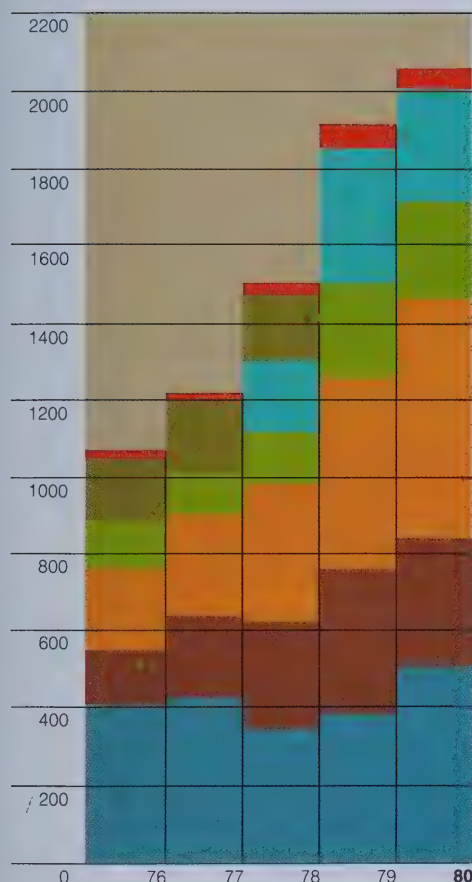
In 1980, Northern Telecom paid out \$33.8 million in dividends to shareholders or \$1.00 per share, compared with \$26.2 million, or \$0.85 per share in 1979. Northern Telecom's dividends are declared in Canadian funds. While Northern Telecom intends to continue paying quarterly dividends, the level of

future dividends will be decided by the Board of Directors in view of earnings from operations, capital requirements and the financial condition of Northern Telecom.

Dividends on Northern Telecom shares paid, or credited, or deemed paid to non-residents of Canada are subject to 20 percent withholding tax under the Income Tax Act of Canada unless reduced by treaty with another government. Under the present United States-Canada Tax Treaty, the rate of withholding tax on Northern Telecom dividends paid, or credited, or deemed paid, to individuals residing in, or corporations organized under the laws of, the United States, and not having a "permanent establishment" in Canada, is 10 percent.

The present United States-Canada Tax Treaty also states that gains derived in Canada from the sale or exchange of Northern Telecom shares by a resident or corporation of the United States are exempt from taxation in Canada provided that the resident or corporation has no "permanent establishment" in Canada.

**Revenues by principal products and services**  
(\$ millions)



**Business segments and principal product lines**  
(as approved by the Board of Directors)

| (thousands of dollars)                                                 | 1980        | 1979        | 1978        | 1977        | 1976        |
|------------------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Sales to customers<sup>1</sup></b>                                  |             |             |             |             |             |
| Telecommunications equipment                                           |             |             |             |             |             |
| Central office switching . . . . .                                     | \$ 505,152  | \$ 386,025  | \$ 338,889  | \$ 412,618  | \$ 401,929  |
| Subscriber apparatus and business communications systems . . . .       | 618,591     | 524,641     | 374,309     | 275,341     | 213,834     |
| Wire, cable, and outside plant . .                                     | 349,909     | 366,738     | 276,572     | 215,127     | 145,984     |
| Transmission . . . . .                                                 | 277,563     | 227,287     | 141,325     | 114,468     | 124,512     |
|                                                                        | 1,751,215   | 1,504,691   | 1,131,095   | 1,017,554   | 886,259     |
| Electronic office systems . . . . .                                    | 258,944     | 349,823     | 171,513     | —           | —           |
| Electrical and electronic products distribution <sup>2</sup> . . . . . | —           | —           | 162,839     | 173,710     | 184,625     |
| Other (principally research and development) <sup>3</sup> . . . . .    | 44,402      | 46,008      | 39,113      | 30,658      | 12,607      |
| Total . . . . .                                                        | \$2,054,561 | \$1,900,522 | \$1,504,560 | \$1,221,922 | \$1,083,491 |
| <b>Operating earnings<sup>1</sup></b>                                  |             |             |             |             |             |
| Telecommunications equipment .                                         | \$187,389   | \$234,500   | \$180,901   | \$184,549   | \$168,018   |
| Electronic office systems . . . . .                                    | (86,699)    | 26,017      | 30,020      | —           | —           |
| Electrical and electronic products distribution <sup>2</sup> . . . . . | —           | —           | 8,851       | 8,043       | 8,666       |
| Other . . . . .                                                        | 3,527       | 1,680       | —           | —           | —           |
| Total . . . . .                                                        | \$ 104,217  | \$ 262,197  | \$ 219,772  | \$ 192,592  | \$ 176,684  |

Notes:

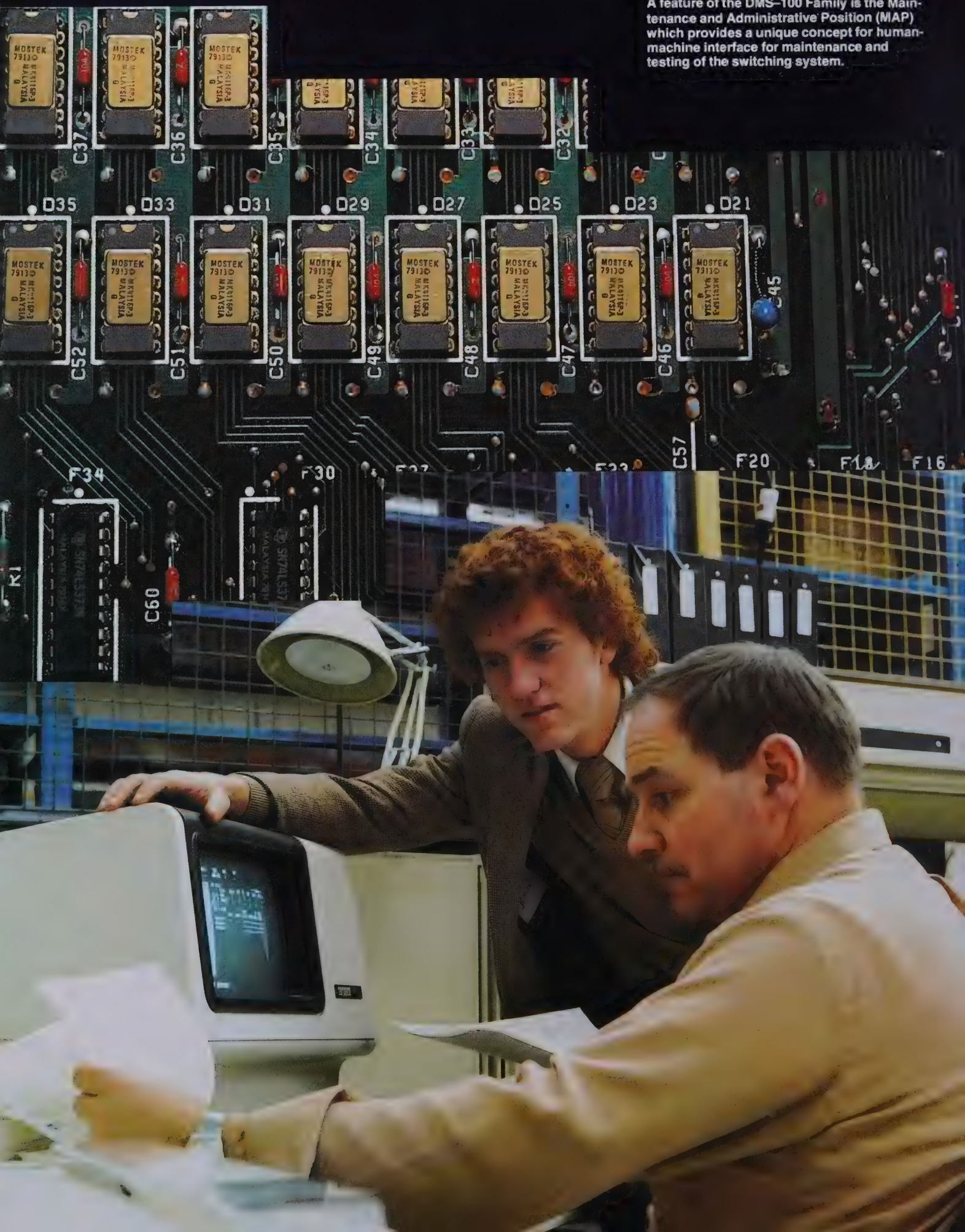
<sup>1</sup> Sales to customers, and operating earnings, which exclude general corporate expenses, have been restated for 1977 and prior years to conform with the presentation adopted in 1978.

<sup>2</sup> Business discontinued effective December 31, 1978.

<sup>3</sup> Other includes sales of BNR from August 3, 1976.



A feature of the DMS-100 Family is the Maintenance and Administrative Position (MAP) which provides a unique concept for human-machine interface for maintenance and testing of the switching system.





## Consolidated statement of operations

Northern Telecom Limited  
year ended December 31  
(thousands of dollars)

|                                                                                           | 1980                | 1979        | 1978        |
|-------------------------------------------------------------------------------------------|---------------------|-------------|-------------|
| Revenues (note 17) .....                                                                  | <b>\$2,054,561</b>  | \$1,900,522 | \$1,504,560 |
| Cost of revenues .....                                                                    | <b>1,550,430</b>    | 1,304,096   | 1,032,088   |
| Gross profit .....                                                                        | <b>504,131</b>      | 596,426     | 472,472     |
| Selling, research and development, and general and administrative expenses (note 3) ..... | <b>482,390</b>      | 412,591     | 326,759     |
| Operating earnings .....                                                                  | <b>21,741</b>       | 183,835     | 145,713     |
| Investment and other income (net) (note 4) .....                                          | <b>10,484</b>       | 3,762       | 10,589      |
| Interest charges – long-term debt .....                                                   | <b>(20,207)</b>     | (26,432)    | (13,781)    |
| – other .....                                                                             | <b>(24,709)</b>     | (11,783)    | (3,360)     |
| Foreign currency gains (losses) .....                                                     | <b>(1,211)</b>      | (426)       | 5,091       |
| Earnings (loss) before income taxes and extraordinary items .....                         | <b>(13,902)</b>     | 148,956     | 144,252     |
| Provision for income taxes (note 5) .....                                                 | <b>(7,494)</b>      | (35,484)    | (49,868)    |
| Earnings (loss) before extraordinary items .....                                          | <b>(21,396)</b>     | 113,472     | 94,384      |
| Extraordinary items (notes 2 and 6) .....                                                 | <b>(163,759)</b>    | —           | 6,344       |
| Net earnings (loss) (note 2) .....                                                        | <b>\$ (185,155)</b> | \$ 113,472  | \$ 100,728  |
| Earnings (loss) per share* (note 2)                                                       |                     |             |             |
| – before extraordinary items .....                                                        | <b>\$(0.63)</b>     | \$3.70      | \$3.33      |
| – after extraordinary items .....                                                         | <b>\$(5.48)</b>     | \$3.70      | \$3.55      |
| Dividends declared per common share .....                                                 | <b>\$ 1.00</b>      | \$0.85      | \$0.74      |
| * Based on weighted average number of common shares outstanding (thousands) .....         | <b>33,795</b>       | 30,656      | 28,344      |

The important differences between Canadian and United States generally accepted accounting principles affecting the consolidated statement of operations are described and reconciled in note 2 of Notes to consolidated financial statements.

## Consolidated statement of retained earnings

Northern Telecom Limited  
year ended December 31  
(thousands of dollars)

|                                                                                       | 1980             | 1979      | 1978      |
|---------------------------------------------------------------------------------------|------------------|-----------|-----------|
| Balance at beginning of year .....                                                    | <b>\$473,654</b> | \$389,010 | \$309,619 |
| Add: Net earnings (loss) .....                                                        | <b>(185,155)</b> | 113,472   | 100,728   |
|                                                                                       | <b>288,499</b>   | 502,482   | 410,347   |
| Deduct: Dividends paid .....                                                          | <b>33,791</b>    | 26,155    | 21,337    |
| Expenses of issue of capital stock, less applicable income taxes of \$1,975,000 ..... | <b>—</b>         | 2,673     | —         |
|                                                                                       | <b>33,791</b>    | 28,828    | 21,337    |
| Balance at end of year .....                                                          | <b>\$254,708</b> | \$473,654 | \$389,010 |



# Consolidated balance sheet

Northern Telecom Limited  
as at December 31  
(thousands of dollars)

|                                                                                                    | 1980               | 1979               |
|----------------------------------------------------------------------------------------------------|--------------------|--------------------|
| <b>Assets</b>                                                                                      |                    |                    |
| Current                                                                                            |                    |                    |
| Cash and short-term investments at cost (approximates market value) . . . . .                      | \$ 13,364          | \$ 6,750           |
| Accounts receivable                                                                                |                    |                    |
| Affiliated companies . . . . .                                                                     | 63,260             | 47,642             |
| Trade (less provision for uncollectibles \$12,469,000 for 1980 and \$5,460,000 for 1979) . . . . . | 355,317            | 376,792            |
| Inventories (note 7) . . . . .                                                                     | 548,735            | 492,539            |
| Prepaid expenses . . . . .                                                                         | 11,293             | 16,301             |
| Tax benefit of loss carryforward (note 5) . . . . .                                                | 32,607             | —                  |
| Deferred income taxes . . . . .                                                                    | 25,196             | 37,858             |
|                                                                                                    | <b>1,049,772</b>   | <b>977,882</b>     |
| Long-term receivables (note 8) . . . . .                                                           | <b>33,143</b>      | <b>41,296</b>      |
| Investments                                                                                        |                    |                    |
| Non-consolidated subsidiaries (note 9a) . . . . .                                                  | 347,847            | 280,542            |
| Associated companies (note 9b) . . . . .                                                           | 19,318             | 16,485             |
| Other . . . . .                                                                                    | 4,597              | 4,791              |
|                                                                                                    | <b>371,762</b>     | <b>301,818</b>     |
| Plant and equipment – net (note 10) . . . . .                                                      | <b>497,928</b>     | <b>420,985</b>     |
| Goodwill and other assets (notes 1 and 11) . . . . .                                               | <b>33,001</b>      | <b>142,538</b>     |
| Total assets . . . . .                                                                             | <b>\$1,985,606</b> | <b>\$1,884,519</b> |

On behalf of the  
Board of Directors

Charles Perrault  
Director

J. Douglas Gibson, O.B.E.  
Director

|                                                                               | 1980               | 1979               |
|-------------------------------------------------------------------------------|--------------------|--------------------|
| <b>Liabilities</b>                                                            |                    |                    |
| Current                                                                       |                    |                    |
| Notes payable                                                                 | \$ 132,401         | \$ 100,619         |
| Accounts payable and accrued liabilities                                      |                    |                    |
| Affiliated companies                                                          | 581                | 897                |
| Employees' payroll                                                            | 19,068             | 11,863             |
| Vacation pay accrued                                                          | 22,285             | 17,466             |
| Interest accrued                                                              | 7,303              | 3,392              |
| Trade and other                                                               | 383,992            | 233,302            |
| Taxes payable                                                                 | 4,593              | 22,193             |
| Due to non-consolidated subsidiaries (note 9a)                                | 19,101             | 23,445             |
| Long-term debt instalments due within one year (note 13)                      | 7,709              | 7,780              |
|                                                                               | <b>597,033</b>     | <b>420,957</b>     |
| Deferred income                                                               | 3,212              | 5,975              |
| Due to non-consolidated subsidiaries (note 9a)                                | 236,793            | 245,378            |
| Long-term debt (note 13)                                                      | 321,712            | 192,061            |
| Deferred income taxes                                                         | 86,479             | 90,942             |
| Minority interest in subsidiary companies                                     |                    |                    |
| Capital stock                                                                 | 11,607             | 11,337             |
| Retained earnings                                                             | 456                | 254                |
|                                                                               | <b>1,257,292</b>   | <b>966,904</b>     |
| <b>Shareholders' equity</b>                                                   |                    |                    |
| Capital stock                                                                 |                    |                    |
| 34,432,788 common shares outstanding in 1980 and 33,592,901 in 1979 (note 14) | 473,606            | 443,961            |
| Retained earnings                                                             | 254,708            | 473,654            |
|                                                                               | <b>728,314</b>     | <b>917,615</b>     |
| <b>Commitments and contingencies (note 16)</b>                                |                    |                    |
| Total liabilities and shareholders' equity                                    | <b>\$1,985,606</b> | <b>\$1,884,519</b> |

The integrity and objectivity of the financial statements and accompanying notes in the annual report are the responsibility of management.

To fulfill this responsibility, Northern Telecom Limited maintains internal control systems to provide reasonable assurance that the books and records, from which the financial statements are derived accurately reflect all transactions and that established policies and procedures are followed. The internal control systems are supported by regular reviews by internal auditors and by examination of the financial statements by Touche Ross & Co., independent chartered accountants.

The Audit Committee of the Board of Directors meets regularly with the independent chartered accountants and with representatives of management and the internal auditors to approve the scope of audit work and to assess reports on audit work performed. The independent auditors have full access to the Audit Committee, with and without management present. The Audit Committee reviews quarterly and annual financial statements and presents minutes of its meetings to the full Board of Directors for approval.



# Consolidated statement of changes in financial position

Northern Telecom Limited  
year ended December 31  
(thousands of dollars)

|                                                          | 1980        | 1979       | 1978       |
|----------------------------------------------------------|-------------|------------|------------|
| <b>Source of funds</b>                                   |             |            |            |
| Operations:                                              |             |            |            |
| Earnings (loss) before extraordinary items               | \$ (21,396) | \$ 113,472 | \$ 94,384  |
| Items not requiring funds                                |             |            |            |
| Depreciation and amortization                            | 117,632     | 92,370     | 55,102     |
| Amortization of goodwill                                 | 2,030       | 3,367      | 3,486      |
| Deferred income taxes                                    | 8,433       | 17,646     | 25,807     |
| Equity earnings in non-consolidated finance subsidiaries | (58,178)    | (21,473)   | —          |
| Other – net                                              | 193         | 1,009      | (2,563)    |
| Total from operations exclusive of extraordinary items   | 48,714      | 206,391    | 176,216    |
| Extraordinary items (net of non-fund items)              | (57,328)    | —          | 6,344      |
| Proceeds from long-term debt                             | 224,766     | 330,305    | 138,638    |
| Net proceeds from issuance of capital stock              | 29,645      | 197,732    | —          |
| Issuance of capital stock on acquisition                 | —           | —          | 84,574     |
| Capital contribution by minority shareholders            | —           | 10,328     | —          |
| Disposals of plant and equipment                         | 34,784      | 33,637     | 15,036     |
| Proceeds from sale of investments                        | 1,761       | 4,502      | —          |
| Long-term receivables                                    | 8,153       | 3,636      | (6,300)    |
|                                                          | 290,495     | 786,531    | 414,508    |
| <b>Application of funds</b>                              |             |            |            |
| Expenditures for plant and equipment                     | 225,582     | 173,536    | 127,228    |
| Reduction of long-term debt                              | 95,115      | 328,090    | 111,367    |
| Dividends                                                | 33,791      | 26,155     | 21,337     |
| Due to non-consolidated finance subsidiaries             | 8,585       | (165,957)  | (79,421)   |
| Investment in non-consolidated finance subsidiaries      | 10,649      | 233,835    | 23,712     |
| Deferred income                                          | 2,763       | 1,198      | (3,455)    |
| Net non-current assets acquired                          | —           | —          | 178,438    |
| Other                                                    | 18,196      | 22         | 5,118      |
|                                                          | 394,681     | 596,879    | 384,324    |
| Increase (decrease) in working capital                   | (104,186)   | 189,652    | 30,184     |
| Working capital at beginning of year                     | 556,925     | 367,273    | 337,089    |
| Working capital at end of year                           | \$ 452,739  | \$ 556,925 | \$ 367,273 |

|                                                                        | 1980               | 1979        | 1978        |
|------------------------------------------------------------------------|--------------------|-------------|-------------|
| <b>The increase (decrease) in working capital is accounted for by:</b> |                    |             |             |
| Current assets:                                                        |                    |             |             |
| Cash and short-term investments .....                                  | \$ 6,614           | \$ (10,493) | \$ (87,919) |
| Accounts receivable .....                                              | (5,857)            | 111,400     | 128,823     |
| Inventories .....                                                      | 56,196             | 131,137     | 142,965     |
| Prepaid expenses .....                                                 | (5,008)            | 8,243       | 2,182       |
| Tax benefit of loss carryforward .....                                 | 32,607             | —           | —           |
| Deferred income taxes .....                                            | (12,662)           | 8,526       | 14,345      |
| Current liabilities:                                                   |                    |             |             |
| Notes payable and due to banks .....                                   | (31,782)           | (37,007)    | (36,871)    |
| Accounts payable and accrued liabilities .....                         | (166,309)          | (15,334)    | (100,972)   |
| Taxes payable .....                                                    | 17,600             | (13,560)    | 5,027       |
| Due to non-consolidated subsidiaries .....                             | 4,344              | 4,463       | (27,908)    |
| Long-term debt instalments due within one year .....                   | 71                 | 2,277       | (9,488)     |
| Increase (decrease) in working capital, as above .....                 | <b>\$(104,186)</b> | \$189,652   | \$ 30,184   |



# Consolidated ten-year review

Northern Telecom Limited  
(millions of dollars)

|                                                  | 1980             | 1979      | 1978      | 1977      |
|--------------------------------------------------|------------------|-----------|-----------|-----------|
| <b>Earnings and related data***</b>              |                  |           |           |           |
| Revenues .....                                   | <b>\$2,054.6</b> | \$1,900.5 | \$1,504.6 | \$1,221.9 |
| Revenues of company manufactured products .....  | <b>2,010.2</b>   | 1,854.5   | 1,330.1   | 1,047.1   |
| Depreciation on plant and equipment .....        | <b>112.7</b>     | 88.4      | 52.5      | 30.9      |
| Research and development expenses .....          | <b>140.9</b>     | 132.6     | 97.8      | 68.2      |
| Interest charges .....                           | <b>44.9</b>      | 38.2      | 17.1      | 6.6       |
| Provision for income taxes* .....                | <b>4.3</b>       | 35.5      | 36.7      | 44.9      |
| Net earnings (loss) .....                        | <b>(185.2)</b>   | 113.5     | 100.7     | 85.3      |
| Earnings (loss) per revenue dollar (cents) ..... | <b>(9.0)</b>     | 6.0       | 6.7       | 7.0       |
| Earnings (loss) per share (dollars)              |                  |           |           |           |
| – before extraordinary items .....               | <b>(0.63)</b>    | 3.70      | 3.33      | 3.09      |
| – after extraordinary items .....                | <b>(5.48)</b>    | 3.70      | 3.55      | 3.22      |
| Dividends per share (dollars) .....              | <b>1.00</b>      | 0.85      | 0.74      | 0.66      |
| <b>Financial position at December 31</b>         |                  |           |           |           |
| Working capital .....                            | <b>452.7</b>     | 556.9     | 367.3     | 337.1     |
| Plant & equipment (at cost) .....                | <b>835.9</b>     | 692.7     | 602.1     | 388.8     |
| Accumulated depreciation .....                   | <b>338.0</b>     | 271.7     | 231.5     | 203.1     |
| Total assets .....                               | <b>1,985.6</b>   | 1,884.5   | 1,344.2   | 760.1     |
| Long-term debt** .....                           | <b>321.7</b>     | 192.0     | 189.8     | 52.4      |
| Shareholders' equity .....                       | <b>728.3</b>     | 917.6     | 632.6     | 468.6     |
| Capital expenditures .....                       | <b>225.6</b>     | 173.5     | 127.2     | 44.7      |
| <b>Employees at December 31</b> .....            | <b>31,915†</b>   | 33,301†   | 31,756†   | 24,962    |
| <b>Compensation</b>                              |                  |           |           |           |
| Payroll .....                                    | <b>730.2</b>     | 651.8     | 482.9     | 395.3     |
| Benefits .....                                   | <b>131.5</b>     | 108.1     | 93.3      | 75.0      |
| Total .....                                      | <b>\$ 861.7</b>  | \$ 759.9  | \$ 576.2  | \$ 470.3  |

† Excludes NETAS employees.

\* Includes income tax effects of extraordinary items.

\*\* Excludes long-term debt of non-consolidated finance subsidiaries incorporated in 1978 and 1979.

\*\*\* If the disposals of segments and the extraordinary items had been classified in accordance with United States generally accepted accounting principles, results from continuing operations would have been as follows:

|                                                                          | 1980             | 1979      | 1978      | 1977      | 1976     | 1975     | 1974     | 1973     | 1972     | 1971     |
|--------------------------------------------------------------------------|------------------|-----------|-----------|-----------|----------|----------|----------|----------|----------|----------|
| Revenues .....                                                           | <b>\$2,054.6</b> | \$1,900.5 | \$1,365.9 | \$1,074.3 | \$ 925.6 | \$ 832.7 | \$ 772.4 | \$ 487.8 | \$ 455.6 | \$ 560.9 |
| Net earnings (loss) .....                                                | <b>(185.2)</b>   | 113.5     | 102.5     | 83.4      | 73.5     | 67.4     | 56.9     | 35.4     | 21.8     | 16.5     |
| Earnings (loss) per share (dollars)<br>(after extraordinary items) ..... | <b>(5.48)</b>    | 3.70      | 3.61      | 3.15      | 2.77     | 2.55     | 2.17     | 1.49     | 0.93     | 0.70     |

| 1976      | 1975     | 1974     | 1973     | 1972     | 1971     |
|-----------|----------|----------|----------|----------|----------|
| \$1,083.5 | \$ 996.8 | \$ 957.7 | \$ 608.1 | \$ 531.3 | \$ 573.8 |
| 922.1     | 843.7    | 799.8    | 512.9    | 448.5    | 473.4    |
| 24.1      | 23.3     | 25.4     | 16.2     | 12.8     | 11.6     |
| 61.4      | 49.0     | 44.0     | 32.7     | 28.0     | 29.7     |
| 6.8       | 8.3      | 7.7      | 6.5      | 5.6      | 5.7      |
| 48.0      | 44.7     | 49.6     | 30.5     | 21.0     | 14.5     |
| 77.1      | 67.5     | 53.8     | 32.0     | 20.1     | 12.6     |
| 7.1       | 6.8      | 5.6      | 5.3      | 3.8      | 2.2      |
| 2.79      | 2.65     | 2.05     | 1.35     | 0.86     | 0.54     |
| 2.91      | 2.55     | 2.05     | 1.35     | 0.85     | 0.54     |
| 0.61      | 0.60     | 0.525    | 0.50     | 0.50     | 0.50     |
| 307.6     | 284.9    | 281.4    | 209.7    | 175.3    | 176.9    |
| 360.1     | 284.5    | 273.4    | 257.3    | 233.8    | 226.7    |
| 189.2     | 162.7    | 156.6    | 141.3    | 127.6    | 123.8    |
| 674.8     | 570.4    | 555.2    | 494.3    | 370.4    | 361.1    |
| 58.3      | 67.8     | 104.5    | 69.6     | 73.5     | 77.1     |
| 400.8     | 339.9    | 285.2    | 245.0    | 192.1    | 183.8    |
| 38.2      | 31.7     | 33.2     | 26.3     | 19.1     | 21.6     |
| 25,277    | 23,751   | 26,147   | 25,073   | 20,787   | 23,230   |
| 347.2     | 325.0    | 301.2    | 214.1    | 192.2    | 199.8    |
| 58.0      | 45.0     | 41.2     | 35.1     | 30.0     | 28.5     |
| \$ 405.2  | \$ 370.0 | \$ 342.4 | \$ 249.2 | \$ 222.2 | \$228.3  |



## 1 Accounting policies

The accompanying financial statements have been prepared in accordance with Canadian generally accepted accounting principles and conform in all material respects with International Accounting Standards. With respect to the consolidated financial statements of Northern Telecom Limited and its subsidiary companies, the important differences between Canadian and United States generally accepted accounting principles are described and reconciled in note 2.

### a) Principles of consolidation

The consolidated financial statements include the accounts of the corporation and all subsidiary companies except the finance subsidiary companies, which are accounted for on the equity basis. When stock ownership and control of subsidiary companies is acquired, the operations of these companies are included in the consolidated financial statements since the date of acquisition of control.

The finance subsidiaries are not consolidated as their business is fundamentally different from that of the consolidated group. In the consolidated statement of earnings, the earnings from operations of the finance subsidiaries reduce long-term interest charges; unrealized foreign currency losses and income taxes are included in the respective captions.

### b) Translation of foreign currencies

Current assets (excluding inventories and prepaid expenses), current liabilities and long-term monetary assets and liabilities are translated at the rates in effect at the balance sheet date, whereas other assets (including inventories and prepaid expenses) and other liabilities are translated at rates prevailing at the respective transaction dates. Revenues and expenses are translated at average rates prevailing during the year except for cost of inventory used, depreciation and amortization which are translated at exchange rates prevailing when the related assets were manufactured or acquired. Currency gains and losses are reflected in net earnings of the year, except for unrealized currency gains and losses on long-term monetary assets and liabilities which are amortized over the remaining lives of the related items.

### c) Rental revenue

For operating leases, rental revenue is recognized when billed to customers. For leases which qualify as sales-type leases, the present value of future rental payments is recorded as sales revenue at the inception of the lease.

### d) Depreciation

Depreciation is calculated generally on the straight-line method using rates based on the expected useful lives of the respective assets as follows:

Buildings 20 to 40 years; machinery and equipment 3 to 16 years; and equipment for lease to customers 4 years.

### e) Research and development

Research and development expenditures are charged to earnings in the years in which they are incurred, except for expenditures incurred pursuant to specific contracts for the manufacture of telecommunications equipment, which are charged to earnings in the same period as the related revenue is recognized.

### f) Income taxes

The corporation and its subsidiary companies follow the practice of providing for income taxes based on taxable income included in the financial statements regardless of when such income is subject to payment of taxes under the tax laws.

### g) Inventories

Inventories are valued at the lower of cost (calculated generally on a first-in, first-out basis) and net realizable value. The cost of finished goods and work-in-process inventories is comprised of material, labor and manufacturing overhead.

### h) Goodwill

Goodwill represents the unamortized excess of the acquisition costs over the net assets of subsidiary companies and is amortized over periods not exceeding 40 years.

## 2 Differences between Canadian and United States generally accepted accounting principles

The important differences between Canadian and United States generally accepted accounting principles consist of:

### a) Translation of foreign currencies

If the financial statements had been prepared as required in the United States by the Financial Accounting Standards Board, net earnings (loss) as reported would have been reduced by \$64,000 in 1980 (\$ nil per share), increased by \$2,819,000 in 1979 (\$0.09 per share) and reduced by \$3,529,000 (\$0.12 per share) in 1978.

### b) Extraordinary items

1980

The extraordinary items of \$163,759,000 (\$(4.85) per share) reported in 1980, as described in note 6, do not meet the criteria of an extraordinary item under United States practice; consequently that amount would be deducted to determine income before extraordinary items for that year. Net income is identical under both Canadian and United States reporting practices.

1978

Under United States practice the extraordinary item of \$3,192,000 relating to the termination of the electrical and electronic distribution business, as described in note 6, would have been reported as discontinued operations; accordingly sales would have been decreased by \$138,637,000, earnings from continuing operations would have been increased by \$1,754,000 (\$0.06 per share) to \$102,482,000 (\$3.61 per share), and loss from discontinued operations would have been \$1,754,000 (\$0.06 per share). The remaining extraordinary item in 1978 of \$9,536,000 relating to realization of tax losses is an extraordinary item under both Canadian and United States generally accepted accounting principles.

If the above items were reported in accordance with United States generally accepted accounting principles, the results of operations would have been as follows:

| (thousands of dollars)                     | 1980         | 1979        | 1978        |
|--------------------------------------------|--------------|-------------|-------------|
| Revenues from continuing operations        | \$2,054,561  | \$1,900,522 | \$1,365,923 |
| Earnings (loss) before extraordinary items | \$ (185,219) | \$ 116,291  | \$ 87,663   |
| Earnings (loss) from continuing operations | \$ (185,219) | \$ 116,291  | \$ 98,953   |
| Net earnings (loss)                        | \$ (185,219) | \$ 116,291  | \$ 97,199   |
| Earnings (loss) per share                  |              |             |             |
| – before extraordinary items               | \$ (5.48)    | \$3.79      | \$3.09      |
| – from continuing operations               | \$ (5.48)    | \$3.79      | \$3.49      |
| – net earnings (loss)                      | \$ (5.48)    | \$3.79      | \$3.43      |

### 3 Research and development

Research and development expenditures for the years ended December 31, 1980, 1979, and 1978 amounted to \$193,188,000, \$178,498,000, and \$135,467,000, respectively. These expenditures included the costs of research and development charged to customers of Bell-Northern Research Ltd. and B-N Software Research Inc., principally Bell Canada, and costs expended pursuant to specific contracts for the manufacture of telecommunications equipment which are accounted for as contract costs. The net expense of research and development to the corporation in the years 1980 through 1978 inclusive was \$140,946,000, \$132,639,000, and \$97,835,000.

### 4 Investment and other income (net)

Investment and other income (net) includes equity in the net earnings of associated companies of \$3,500,000, \$2,443,000 and \$3,828,000 for the years ended December 31, 1980, 1979, and 1978, respectively.

### 5 Provision for income taxes

A reconciliation showing income taxes calculated at the Canadian statutory rate to the provision for income taxes is as follows:

| (thousands of dollars)                                                                         | 1980       | 1979      | 1978      |
|------------------------------------------------------------------------------------------------|------------|-----------|-----------|
| Income taxes at Canadian statutory rate including provincial income taxes                      | \$ (7,104) | \$ 72,839 | \$ 69,962 |
| (i) Reduction of Canadian taxes applicable to:                                                 |            |           |           |
| Manufacturing profits                                                                          | (2,720)    | (6,914)   | (6,360)   |
| Research and development credits                                                               | (17,603)   | (13,183)  | (5,408)   |
| Inventory credit                                                                               | (3,623)    | (2,926)   | (2,487)   |
| (ii) Non-taxable portion of unrealized currency gains                                          | (602)      | (26)      | (2,196)   |
| (iii) Difference between Canadian statutory rates and those applicable to foreign subsidiaries | (31,618)   | (15,924)  | (613)     |
| (iv) Effect of losses of foreign subsidiaries not recognized                                   | 65,788     | –         | –         |
| (v) Other                                                                                      | 4,976      | 1,618     | (3,030)   |
|                                                                                                | \$ 7,494   | \$ 35,484 | \$ 49,868 |

Details of provision for income taxes are as follows:

| (thousands of dollars)           | 1980      | 1979      | 1978      |
|----------------------------------|-----------|-----------|-----------|
| Current                          | \$ 31,902 | \$ 31,882 | \$ 40,463 |
| Deferred                         | 8,199     | 3,602     | 9,405     |
| Tax effect of operating loss     | (32,607)  | –         | –         |
| Total provision for income taxes | \$ 7,494  | \$ 35,484 | \$ 49,868 |
| Canadian                         | \$ 24,414 | \$ 32,322 | \$ 36,349 |
| Foreign                          | (16,920)  | 3,162     | 13,519    |
| Total provision for income taxes | \$ 7,494  | \$ 35,484 | \$ 49,868 |

Earnings (loss) before income taxes and extraordinary items are as follows:

| (thousands of dollars) | 1980        | 1979      | 1978      |
|------------------------|-------------|-----------|-----------|
| Canadian               | \$ 81,815   | \$105,797 | \$110,101 |
| Foreign                | (95,717)    | 43,159    | 34,151    |
| Total                  | \$ (13,902) | \$148,956 | \$144,252 |



During the year ended December 31, 1980 the corporation recorded tax benefits on a portion of the losses incurred in 1980 by foreign operations. These benefits amounting to \$32,607,000 are shown separately in the balance sheet and, in the opinion of management, there is virtual certainty, that sufficient taxable income will be earned in 1981 to use these losses in reducing income tax otherwise payable.

At December 31, 1980 foreign subsidiaries had tax loss carryforwards for accounting purposes of approximately \$150,000,000, including \$36,400,000 representing the tax deductible portion of the extraordinary items, which have not been recognized in the accounts and are available to reduce taxable income in future years. Of the total, \$3,300,000 will expire if not used between 1981 and 1985, \$136,800,000 will expire in 1987, while \$9,900,000 can be carried forward indefinitely.

## 6 Extraordinary items

During 1978 the corporation acquired Sycor, Inc. and DATA 100 Corporation (which together form the electronic office systems business), Eastern Data Industries, Inc. (Spectron) and Danray, Inc. for an aggregate consideration of \$277,007,000 in cash, notes and common shares of the corporation. Of this amount \$108,354,000 was attributed to goodwill and technology.

|                                                                                                                                                                                                                   | (thousands of<br>dollars) | (dollars<br>per share) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------|
| 1980                                                                                                                                                                                                              |                           |                        |
| Write-offs in the fourth quarter of:                                                                                                                                                                              |                           |                        |
| Unamortized goodwill and technology<br>due to unsatisfactory operating<br>performance of the electronic office<br>system business, and \$8,542,000<br>relating to Danray, Inc. technology                         | \$(106,431)               | \$(3.15)               |
| Costs relating to the discontinuance<br>of certain elements of the electronic<br>office systems business (less<br>applicable income taxes of<br>\$3,241,000)                                                      | (57,328)                  | (1.70)                 |
|                                                                                                                                                                                                                   | <u>\$(163,759)</u>        | <u>\$(4.85)</u>        |
| 1978                                                                                                                                                                                                              |                           |                        |
| Reduction of income taxes arising from<br>the use of prior years' losses of a<br>subsidiary company                                                                                                               | \$ 9,536                  | \$ 0.33                |
| Provision for costs of terminating the<br>Canadian electrical and electronic<br>products distribution business<br>(Nedco Ltd. and Zenronics Ltd.)<br>disposed of (less applicable<br>income taxes of \$3,648,000) | (3,192)                   | (0.11)                 |
|                                                                                                                                                                                                                   | <u>\$ 6,344</u>           | <u>\$ 0.22</u>         |

## 7 Inventories

At December 31, inventories consisted of the following:

|                 | 1980                        | 1979                 |
|-----------------|-----------------------------|----------------------|
| Raw materials   | <b>\$174,801,000</b>        | \$167,553,000        |
| Work in process | <b>191,205,000</b>          | 164,697,000          |
| Finished goods  | <b>182,729,000</b>          | 160,289,000          |
|                 | <u><b>\$548,735,000</b></u> | <u>\$492,539,000</u> |

## 8 Long-term receivables and lease commitments (corporation as lessor)

At December 31, 1980 amounts due to the corporation and consolidated subsidiaries under noncancellable leases and instalment receivables are as follows:

|                         | Operating<br>leases | Sales-type<br>leases and<br>instalment<br>receivables |
|-------------------------|---------------------|-------------------------------------------------------|
| Year ending December 31 |                     |                                                       |
| 1981                    | \$16,550,000        | \$24,541,000                                          |
| 1982                    | 3,986,000           | 19,770,000                                            |
| 1983                    | 542,000             | 12,640,000                                            |
| 1984                    | 220,000             | 2,986,000                                             |
| 1985                    | 121,000             | 397,000                                               |
| Thereafter              | 2,924,000           | 1,254,000                                             |
|                         | <u>\$24,343,000</u> | <u>61,588,000</u>                                     |
| Less: unearned income   |                     | 7,140,000                                             |
| current portion         |                     | <u>21,305,000</u>                                     |
|                         |                     | <u>\$33,143,000</u>                                   |

Certain of the rights to receive revenue under operating and sales-type leases have been sold to finance subsidiaries and are not included above (see note 9).

## 9 Investments in non-consolidated subsidiaries and an associated company

The following information relates to the investments carried on the equity basis.

### a) Non-consolidated finance company subsidiaries

In December 1978 and June 1979 finance subsidiaries were incorporated and purchased from other subsidiaries of the corporation rights to receive rental revenues and other income. Such other subsidiaries of the corporation will continue to collect such rental revenues on behalf of the finance company subsidiaries. The finance company subsidiaries commenced operations during 1979. The following is a summary of the combined assets and liabilities of the finance company subsidiaries at December 31:



A laser optical bench (top) is used to test components for a fiber optics system. Glass fiber cable (bottom) will be produced at Northern Telecom Canada's new plant under construction in Saskatoon, Saskatchewan.

|                                           | 1980                 | 1979                 |
|-------------------------------------------|----------------------|----------------------|
| <b>Assets</b>                             |                      |                      |
| Cash and short-term investments . . . . . | \$ 59,446,000        | \$ —                 |
| Receivables . . . . .                     | 39,364,000           | —                    |
| Rights to receive rental revenue under:   |                      |                      |
| Sales-type leases . . . . .               | 27,281,000           | 20,048,000           |
| Operating leases . . . . .                | 58,625,000           | 73,977,000           |
| Inter-group loans . . . . .               | 197,269,000          | 194,846,000          |
| Other . . . . .                           | 1,456,000            | 590,000              |
|                                           | <b>\$383,441,000</b> | <b>\$289,461,000</b> |
| <b>Liabilities</b>                        |                      |                      |
| Other liabilities . . . . .               | \$ 17,687,000        | \$ 4,609,000         |
| Notes payable to banks due                |                      |                      |
| December 31, 1986 bearing                 |                      |                      |
| interest at 14.7% on                      |                      |                      |
| December 31, 1980 . . . . .               | 17,907,000           | 5,832,000            |
| Shareholders' equity . . . . .            | 347,847,000          | 279,020,000          |
|                                           | <b>\$383,441,000</b> | <b>\$289,461,000</b> |

The following is a summary of their combined operations for the years ended December 31, 1980 and 1979. (1979 was their first year of operations.)

|                                         | 1980                | 1979                |
|-----------------------------------------|---------------------|---------------------|
| Interest income                         |                     |                     |
| Northern Telecom subsidiaries . . .     | \$49,524,000        | \$30,181,000        |
| other . . . . .                         | 15,595,000          | 2,753,000           |
| Interest expense . . . . .              | (2,168,000)         | (5,571,000)         |
| Administrative expenses . . . . .       | (1,951,000)         | (635,000)           |
| Earnings from operations . . . . .      | 61,000,000          | 26,728,000          |
| Unrealized foreign currency gain (loss) | 6,013,000           | (887,000)           |
| Provision for income taxes . . . . .    | (8,835,000)         | (4,368,000)         |
| Net earnings . . . . .                  | <b>\$58,178,000</b> | <b>\$21,473,000</b> |

Amounts due to finance subsidiaries under non-cancellable leases as at December 31, 1980 were as follows:

|                                 | Operating<br>leases | Sales-type<br>leases |
|---------------------------------|---------------------|----------------------|
| Year ending December 31         |                     |                      |
| 1981 . . . . .                  | \$14,826,000        | \$14,995,000         |
| 1982 . . . . .                  | 3,136,000           | 10,140,000           |
| 1983 . . . . .                  | 913,000             | 4,147,000            |
| 1984 . . . . .                  | 219,000             | 916,000              |
| 1985 . . . . .                  | 46,000              | 356,000              |
|                                 | <b>\$19,140,000</b> | <b>30,554,000</b>    |
| Less: unearned income . . . . . |                     | 3,273,000            |
|                                 |                     | <b>\$27,281,000</b>  |

#### b) Associated company

Included in investments in associated companies is an investment in Intersil, Inc., 21.9 percent of which is owned by a subsidiary of the corporation. The excess of the cost of



the investment (\$11,616,000) over the equity in the underlying net tangible assets amounted to \$3,144,000 at December 31, 1980.

Pursuant to the terms of a cash merger of Intersil, Inc. with another company, effective February 3, 1981, each of Intersil, Inc.'s shares owned by the corporation was exchanged for US\$35 cash (equivalent to C\$55,000,000), resulting in a gain, before taxes, to the corporation of approximately \$36,400,000.

## 10 Plant and equipment

At December 31, plant and equipment consisted of the following:

|                                                 | 1980                 | 1979                 |
|-------------------------------------------------|----------------------|----------------------|
| <b>Cost</b>                                     |                      |                      |
| Land .....                                      | \$ 16,520,000        | \$ 14,244,000        |
| Buildings .....                                 | 141,277,000          | 103,651,000          |
| Machinery and equipment .....                   | 557,937,000          | 471,873,000          |
| Equipment for lease to customers .....          | 86,852,000           | 77,962,000           |
| Property under capital leases .....             | 33,319,000           | 24,982,000           |
|                                                 | <b>835,905,000</b>   | <b>692,712,000</b>   |
| Less: Accumulated depreciation and amortization |                      |                      |
| Buildings .....                                 | 32,126,000           | 29,864,000           |
| Machinery and equipment .....                   | 269,628,000          | 228,830,000          |
| Equipment for lease to customers .....          | 28,839,000           | 8,508,000            |
| Property under capital leases .....             | 7,384,000            | 4,525,000            |
|                                                 | <b>337,977,000</b>   | <b>271,727,000</b>   |
|                                                 | <b>\$497,928,000</b> | <b>\$420,985,000</b> |



A pair of optical fibers is capable of carrying several hundred simultaneous conversations, or one video channel, or 45 million bits of data per second.

## 11 Goodwill and other assets

At December 31, goodwill and other assets consisted of the following:

|                        | 1980                | 1979                 |
|------------------------|---------------------|----------------------|
| Goodwill .....         | \$23,905,000        | \$107,986,000        |
| Technology .....       | 5,558,000           | 33,552,000           |
| Deferred charges ..... | 3,538,000           | 1,000,000            |
|                        | <b>\$33,001,000</b> | <b>\$142,538,000</b> |

Amortization charged to operations for the years 1980 through 1978 inclusive was \$113,094,000, \$8,619,000 and \$7,306,000, respectively. In the fourth quarter of 1980 \$89,412,000 of goodwill and \$17,019,000 of technology were written off as an extraordinary item.

## 12 Unused bank lines of credit

At December 31, 1980, the corporation and certain subsidiary companies had unused short-term operating bank lines of credit, generally available at the prime bank rate of interest, of approximately \$144,000,000.

## 13 Long-term debt

|                                                                                                                                                                                            | 1980                 | 1979                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|
| <b>Sinking fund debentures</b>                                                                                                                                                             |                      |                      |
| 5 3/4% 1962 Series due December 15, 1982 .....                                                                                                                                             | \$ 4,734,000         | \$ 5,734,000         |
| 6 1/2% Series C due April 15, 1986 ..                                                                                                                                                      | 3,693,000            | 3,693,000            |
| 9 3/4% Series D due April 30, 1990 ..                                                                                                                                                      | 26,354,000           | 28,000,000           |
|                                                                                                                                                                                            | <b>34,781,000</b>    | <b>37,427,000</b>    |
| <b>Variable rate term loan of the corporation (U.S. \$25,000,000) due on December 20, 1985. At December 31, 1980 the effective rate was 14.6% ...</b>                                      | <b>29,845,000</b>    | <b>—</b>             |
| <b>12 1/4% notes payable of the corporation (U.S. \$75,000,000) due on October 1, 1990 .....</b>                                                                                           | <b>89,535,000</b>    | <b>—</b>             |
| <b>Revolving bank loan of the corporation (U.S. \$79,900,000) bearing interest at a rate based on the London interbank offered rate. At December 31, 1980 the effective rate was 17.3%</b> | <b>95,386,000</b>    | <b>85,147,000</b>    |
| <b>Revolving bank credit loans of European subsidiaries (various currencies) bearing interest at an average rate of 13.6% .....</b>                                                        | <b>40,900,000</b>    | <b>40,084,000</b>    |
| <b>7% Instalment notes (U.S. dollars) .....</b>                                                                                                                                            | <b>9,176,000</b>     | <b>13,452,000</b>    |
| <b>Obligations under capital leases .....</b>                                                                                                                                              | <b>28,032,000</b>    | <b>21,180,000</b>    |
| <b>Other .....</b>                                                                                                                                                                         | <b>1,766,000</b>     | <b>2,551,000</b>     |
|                                                                                                                                                                                            | <b>329,421,000</b>   | <b>199,841,000</b>   |
| <b>Less amount included in current liabilities .....</b>                                                                                                                                   | <b>7,709,000</b>     | <b>7,780,000</b>     |
|                                                                                                                                                                                            | <b>\$321,712,000</b> | <b>\$192,061,000</b> |



At December 31, 1980, the amount of long-term debt payable, including net sinking fund requirements, in the years 1981 through 1985 was \$7,709,000, \$53,626,000, \$2,291,000, \$21,548,000 and \$51,148,000, respectively.

#### 14 Capital stock

The corporation has an unlimited number of authorized shares, with no limit to the consideration to be received by it upon issue of such shares. As at December 31, 1980 Bell Canada owned 54.7 percent of the outstanding shares of the corporation.

Outstanding shares at December 31 and consideration received were:

|                            | 1980       |               | 1979       |               |
|----------------------------|------------|---------------|------------|---------------|
|                            | Shares     | \$            | Shares     | \$            |
| January 1 ..               | 33,592,901 | \$443,961,000 | 29,592,901 | \$243,556,000 |
| Issued during the year ... | 839,887    | 29,645,000    | 4,000,000  | 200,405,000   |
| December 31                | 34,432,788 | \$473,606,000 | 33,592,901 | \$443,961,000 |

On May 26, 1978, the corporation issued 3,123,407 common shares for an aggregate consideration of \$84,574,000 as a result of a merger of Sycor, Inc. with a wholly owned subsidiary of the corporation.

On September 25, 1979, the corporation sold 4,000,000 common shares for an aggregate consideration of \$200,405,000. Bell Canada purchased 2,000,000 common shares and 2,000,000 common shares were sold to the public.

During the year 1980, 839,887 common shares were issued under the Shareholder Dividend Reinvestment and Stock Purchase Plan which came into effect January 1980. At December 31, 1980 410,113 common shares were reserved for issuance under the Plan.

#### 15 Plans for employees' pensions

Northern Telecom and most of its subsidiary companies have non-contributory defined benefit plans which provide for service pensions based on length of service and rates of pay for substantially all their employees.

The policy is to fund pension costs through contributions based on various actuarial cost methods as permitted by pension regulatory bodies. Such costs are funded as accrued and reflect actuarial assumptions regarding salary projections. Pension costs charged to earnings were \$52,369,000 for the year ended December 31, 1980 (\$43,808,000 1979 and \$34,551,000 1978) which included costs associated with voluntary payments for retired employees.

In compliance with the United States Financial Accounting Standards Board Statement No. 36, the disclosure of the following information is required to exclude actuarial assumptions regarding salary projections. Based on valuation data as at January 1, 1980, the actuarial present value of accumulated plan benefits totals \$456,000,000, of which \$441,000,000 was for vested benefits and \$15,000,000 for non-vested benefits. The weighted average assumed rate of return used in determining the actuarial present value of accumulated plan benefits was seven percent. Net assets available at market value for the above benefits were \$467,000,000 at that date.

#### 16 Leased property and commitments

The classification of future minimum lease payments under capital and operating leases as at December 31, 1980 is as follows:

|                         | Capital      | Operating     |
|-------------------------|--------------|---------------|
| Year ending December 31 |              |               |
| 1981 .....              | \$ 6,714,000 | \$ 17,858,000 |
| 1982 .....              | 5,532,000    | 15,334,000    |
| 1983 .....              | 4,819,000    | 12,987,000    |
| 1984 .....              | 4,773,000    | 11,609,000    |
| 1985 .....              | 4,657,000    | 9,678,000     |
| Thereafter .....        | 45,858,000   | 45,698,000    |
| Total commitments ..... | \$72,353,000 | \$113,164,000 |

Included in capital lease commitments are amounts representing estimated executory costs of \$9,991,000 and interest of \$34,330,000. Future sublease rentals related to operating leases are \$6,322,000.

Rental expense on operating leases amounted to \$29,977,000, \$25,522,000 and \$20,353,000 for the years ended December 31, 1980, 1979 and 1978.



## 17 Information on business segments and geographic areas

*Business segments (as approved by the Board of Directors)*

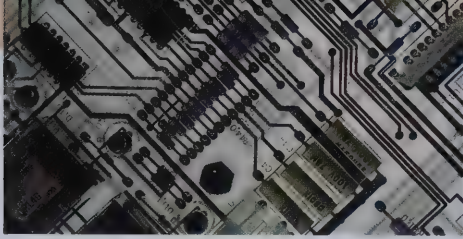
Northern Telecom operates in two major businesses: (1) telecommunications equipment which involves the design, manufacture and sale of central office switching equipment, subscriber apparatus and business communications systems, transmission equipment and wire, cable and related outside plant products; and (2) electronic office systems which involves the design, manufacture and marketing of computer terminals and peripheral equipment. In addition, Northern Telecom has a research and development organization, BNR, which undertakes the major part of the research activities of Northern Telecom and Bell Canada including research, design, development, long-range planning and systems engineering in all phases of telecommunications. In 1978 and prior years, Northern Telecom operated in a third major business, electrical and electronic products distribution; this was discontinued as of December 31, 1978.

The basic programming of an SL-10 data packet switching system may be changed by updating the cassette tape.



The following table sets forth information concerning the business segments for the years ended December 31, 1980, 1979 and 1978.

| (millions of dollars)                                          | 1980             | 1979      | 1978      |
|----------------------------------------------------------------|------------------|-----------|-----------|
| <b>Total revenues*</b>                                         |                  |           |           |
| <i>Telecommunications equipment</i>                            |                  |           |           |
| Sales to customers .....                                       | <b>\$1,751.2</b> | \$1,504.7 | \$1,131.1 |
| Intersegment sales .....                                       | <b>2.1</b>       | 2.5       | 27.3      |
|                                                                | <b>1,753.3</b>   | 1,507.2   | 1,158.4   |
| <i>Electronic office systems</i>                               |                  |           |           |
| Sales to customers .....                                       | <b>259.0</b>     | 349.8     | 171.5     |
| Intersegment sales .....                                       | <b>—</b>         | .3        | .2        |
|                                                                | <b>259.0</b>     | 350.1     | 171.7     |
| <i>Electrical and electronic products distribution</i>         |                  |           |           |
| Sales to customers .....                                       | <b>—</b>         | —         | 162.8     |
| Intersegment sales .....                                       | <b>—</b>         | —         | 4.6       |
|                                                                | <b>—</b>         | —         | 167.4     |
| <i>Other</i>                                                   |                  |           |           |
| Sales to customers .....                                       | <b>44.4</b>      | 46.0      | 39.1      |
| Intersegment sales .....                                       | <b>98.9</b>      | 68.2      | 74.5      |
|                                                                | <b>143.3</b>     | 114.2     | 113.6     |
| Elimination of intersegment sales                              | <b>(101.0)</b>   | (71.0)    | (106.5)   |
| Total sales to customers .....                                 | <b>\$2,054.6</b> | \$1,900.5 | \$1,504.6 |
| <b>Operating earnings</b>                                      |                  |           |           |
| Telecommunications equipment ..                                | <b>\$ 187.4</b>  | \$ 234.5  | \$ 180.9  |
| Electronic office systems .....                                | <b>(86.7)</b>    | 26.0      | 30.0      |
| Electrical and electronic products distribution .....          | <b>—</b>         | —         | 8.9       |
| Other .....                                                    | <b>3.5</b>       | 1.7       | —         |
| Segment operating earnings ....                                | <b>104.2</b>     | 262.2     | 219.8     |
| General corporate expenses ....                                | <b>(82.5)</b>    | (78.4)    | (74.0)    |
| Operating earnings .....                                       | <b>21.7</b>      | 183.8     | 145.8     |
| <b>Equity earnings</b>                                         |                  |           |           |
| Telecommunications equipment ..                                | <b>.1</b>        | —         | .6        |
| Electronic office systems .....                                | <b>—</b>         | —         | 1.1       |
| Other .....                                                    | <b>3.4</b>       | 2.4       | 2.1       |
| Equity earnings .....                                          | <b>3.5</b>       | 2.4       | 3.8       |
| Other income (expense) .....                                   | <b>(39.1)</b>    | (37.2)    | (5.3)     |
| Earnings (loss) before income taxes and extraordinary items .. | <b>\$ (13.9)</b> | \$ 149.0  | \$ 144.3  |



**A printed circuit board such as those used in DMS switching and transmission systems.**

| (millions of dollars)                                                       | 1980             | 1979      | 1978      |
|-----------------------------------------------------------------------------|------------------|-----------|-----------|
| <b>Identifiable assets</b>                                                  |                  |           |           |
| Telecommunications equipment . . . . .                                      | <b>\$1,145.8</b> | \$ 983.5  | \$ 717.7  |
| Electronic office systems . . . . .                                         | <b>393.1</b>     | 503.8     | 433.6     |
| Electrical and electronic products distribution . . . . .                   | —                | —         | 50.7      |
| Other . . . . .                                                             | <b>80.6</b>      | 76.3      | 64.3      |
| Adjustments and eliminations . . . . .                                      | <b>(77.4)</b>    | (53.8)    | (23.1)    |
| Identifiable assets . . . . .                                               | <b>1,542.1</b>   | 1,509.8   | 1,243.2   |
| <b>Investment in non-consolidated subsidiaries and associated companies</b> |                  |           |           |
| Telecommunications equipment . . . . .                                      | —                | 1.7       | 3.0       |
| Electronic office systems . . . . .                                         | —                | —         | —         |
| Not identifiable with a business segment . . . . .                          | <b>367.2</b>     | 295.3     | 38.1      |
| Total investment . . . . .                                                  | <b>367.2</b>     | 297.0     | 41.1      |
| Corporate assets . . . . .                                                  | <b>76.3</b>      | 77.7      | 59.9      |
| Total assets as at December 31 . . . . .                                    | <b>\$1,985.6</b> | \$1,884.5 | \$1,344.2 |

|                                                           | Depreciation   |        |        | Capital expenditures |         |         |
|-----------------------------------------------------------|----------------|--------|--------|----------------------|---------|---------|
|                                                           | 1980           | 1979   | 1978   | 1980                 | 1979    | 1978    |
| <b>Depreciation and capital expenditures</b>              |                |        |        |                      |         |         |
| Telecommunications equipment . . . . .                    | <b>\$ 41.9</b> | \$33.6 | \$25.6 | <b>\$127.8</b>       | \$ 79.0 | \$ 54.2 |
| Electronic office systems . . . . .                       | <b>57.2</b>    | 43.7   | 17.8   | <b>78.1</b>          | 70.1    | 49.3    |
| Electrical and electronic products distribution . . . . . | —              | —      | .5     | —                    | —       | 1.2     |
| Other . . . . .                                           | <b>10.5</b>    | 7.7    | 6.0    | <b>16.0</b>          | 18.7    | 12.0    |
| Corporate . . . . .                                       | <b>3.1</b>     | 3.4    | 2.6    | <b>3.7</b>           | 5.7     | 10.5    |
| Total . . . . .                                           | <b>\$112.7</b> | \$88.4 | \$52.5 | <b>\$225.6</b>       | \$173.5 | \$127.2 |

### Geographic Areas

The following table sets forth information by geographic area for the years ended December 31, 1980, 1979 and 1978.

| (millions of dollars)                                                 | 1980             | 1979      | 1978      |
|-----------------------------------------------------------------------|------------------|-----------|-----------|
| <b>Total revenues*</b>                                                |                  |           |           |
| <i>Canada</i>                                                         |                  |           |           |
| Sales to customers . . . . .                                          | <b>\$1,084.0</b> | \$1,000.8 | \$1,007.9 |
| Transfers between geographic areas . . . . .                          | <b>87.5</b>      | 66.9      | 86.0      |
|                                                                       | <b>1,171.5</b>   | 1,067.7   | 1,093.9   |
| <i>United States</i>                                                  |                  |           |           |
| Sales to customers . . . . .                                          | <b>807.0</b>     | 739.6     | 447.1     |
| Transfers between geographic areas . . . . .                          | <b>67.4</b>      | 20.5      | 19.8      |
|                                                                       | <b>874.4</b>     | 760.1     | 466.9     |
| <i>Other</i>                                                          |                  |           |           |
| Sales to customers . . . . .                                          | <b>163.6</b>     | 160.1     | 49.6      |
| Transfers between geographic areas . . . . .                          | <b>2.8</b>       | —         | .9        |
|                                                                       | <b>166.4</b>     | 160.1     | 50.5      |
| Eliminations of transfers between geographic areas . . . . .          | <b>(157.7)</b>   | (87.4)    | (106.7)   |
| Total sales to customers . . . . .                                    | <b>\$2,054.6</b> | \$1,900.5 | \$1,504.6 |
| <b>Operating earnings</b>                                             |                  |           |           |
| Canada . . . . .                                                      | <b>\$ 253.5</b>  | \$ 239.4  | \$ 223.5  |
| United States . . . . .                                               | <b>(37.1)</b>    | 131.9     | 86.8      |
| Other . . . . .                                                       | <b>26.9</b>      | 24.8      | 7.2       |
| Adjustments and eliminations . . . . .                                | <b>1.8</b>       | (1.3)     | .1        |
| Operating earnings before research and development expenses . . . . . | <b>245.1</b>     | 394.8     | 317.6     |
| Research and development expenses . . . . .                           | <b>(140.9)</b>   | (132.6)   | (97.8)    |
| Segment operating earnings . . . . .                                  | <b>104.2</b>     | 262.2     | 219.8     |
| General corporate expenses . . . . .                                  | <b>(82.5)</b>    | (78.4)    | (74.0)    |
| Operating earnings . . . . .                                          | <b>21.7</b>      | 183.8     | 145.8     |
| Non-operating expenses less other income** . . . . .                  | <b>(35.6)</b>    | (34.8)    | (1.5)     |
| Earnings (loss) before income taxes and extraordinary items . . . . . | <b>\$ (13.9)</b> | \$ 149.0  | \$ 144.3  |



| (millions of dollars)                                                       | 1980             | 1979      | 1978      |
|-----------------------------------------------------------------------------|------------------|-----------|-----------|
| <b>Identifiable assets</b>                                                  |                  |           |           |
| Canada .....                                                                | \$ 663.1         | \$ 573.3  | \$ 532.2  |
| United States .....                                                         | 846.8            | 861.5     | 598.6     |
| Other .....                                                                 | 98.2             | 141.5     | 149.5     |
| Adjustments and eliminations .....                                          | (66.0)           | (66.5)    | (37.1)    |
| Identifiable assets .....                                                   | <b>\$1,542.1</b> | \$1,509.8 | \$1,243.2 |
| <b>Investment in non-consolidated subsidiaries and associated companies</b> |                  |           |           |
| United States .....                                                         | 65.7             | 43.7      | 38.1      |
| Other .....                                                                 | 301.5            | 253.3     | 3.0       |
| Total Investment .....                                                      | <b>367.2</b>     | 297.0     | 41.1      |
| Corporate assets .....                                                      | <b>76.3</b>      | 77.7      | 59.9      |
| Total assets as at December 31 .....                                        | <b>\$1,985.6</b> | \$1,884.5 | \$1,344.2 |

\*Sales to customers include sales to Bell Canada, its telephone subsidiary and associated companies.

\*\*Includes equity in net earnings of associated companies.

Transfers between business segments and geographic areas are made at prices based on total cost of the product to the supplying segment.

The point of origin of revenues and the location of the assets determine the geographic areas.

Of the total sales to customers, including research and development, Bell Canada, its telephone subsidiary and associated companies accounted for \$722,198,000 in 1980, \$695,890,000 in 1979 and \$621,941,000 in 1978. Total sales also includes rental and service revenue of \$150,089,000 in 1980, \$158,418,000 in 1979, and \$70,851,000 in 1978.

Operating earnings represent total sales less operating expenses. Research and development costs cannot be allocated on a geographic basis. In computing operating earnings, none of the following items has been added or deducted: investment and other income (net), interest charges, unrealized currency gains (losses), general corporate expenses, income taxes and extraordinary items.

Identifiable assets are those assets of the corporation that are identified with the operations in each business segment or geographic area. Corporate assets are principally cash, investments and corporate plant and equipment.

Finance subsidiaries incorporated in December 1978 and June 1979 are not consolidated (see Notes 1 and 9a of Notes to consolidated financial statements).

## Supplementary Material

### Quarterly financial data (unaudited)

Summarized consolidated quarterly financial data for 1980 and 1979 is as follows:

| ( millions of dollars )                                                | 4th quarter |         | 3rd quarter |         | 2nd quarter |         | 1st quarter |         |
|------------------------------------------------------------------------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
|                                                                        | 1980        | 1979    | 1980        | 1979    | 1980        | 1979    | 1980        | 1979    |
| Revenues .....                                                         | \$ 533.1    | \$515.2 | \$475.5     | \$433.6 | \$560.6     | \$530.0 | \$485.5     | \$421.7 |
| Gross profit .....                                                     | \$ 105.3    | \$167.1 | \$126.6     | \$130.5 | \$130.7     | \$162.4 | \$141.5     | \$136.4 |
| Earnings (loss) before extraordinary items ..                          | \$ (51.2)   | \$ 35.1 | \$ 4.8      | \$ 22.1 | \$ 0.7      | \$ 31.3 | \$ 24.3     | \$ 25.0 |
| Net earnings (loss) .....                                              | \$ (214.9)  | \$ 35.1 | \$ 4.8      | \$ 22.1 | \$ 0.7      | \$ 31.3 | \$ 24.3     | \$ 25.0 |
| Earnings (loss) per share*                                             |             |         |             |         |             |         |             |         |
| – before extraordinary items .....                                     | \$ (1.50)   | \$ 1.06 | \$ 0.14     | \$ 0.74 | \$ 0.02     | \$ 1.06 | \$ 0.72     | \$ 0.84 |
| – after extraordinary items .....                                      | \$ (6.32)   | \$ 1.06 | \$ 0.14     | \$ 0.74 | \$ 0.02     | \$ 1.06 | \$ 0.72     | \$ 0.84 |
| Weighted average number of common shares outstanding (thousands) ..... | 34,001      | 33,593  | 33,856      | 29,810  | 33,726      | 29,593  | 33,594      | 29,593  |

\* If U.S. generally accepted accounting principles had been used (see note 2 to Notes to consolidated financial statements), earnings (loss) per share before and after extraordinary items would have been:

|                                    |           |         |         |         |         |         |         |         |
|------------------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|
| Earnings (loss) per share          |           |         |         |         |         |         |         |         |
| – before extraordinary items ..... | \$ (6.32) | \$ 1.03 | \$ 0.09 | \$ 0.75 | \$ 0.20 | \$ 1.01 | \$ 0.65 | \$ 1.00 |
| – after extraordinary items .....  | \$ (6.32) | \$ 1.03 | \$ 0.09 | \$ 0.75 | \$ 0.20 | \$ 1.01 | \$ 0.65 | \$ 1.00 |

## Auditors' report

The Shareholders  
Northern Telecom Limited

We have examined the consolidated balance sheets of Northern Telecom Limited as at December 31, 1980 and 1979 and the consolidated statements of operations, retained earnings and changes in financial position for each of the three years in the period ended December 31, 1980. Our examinations were made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these consolidated financial statements present fairly the financial position of the corporation as at December 31, 1980 and 1979 and the results of its operations and the changes in its financial position for each of the three years in the period ended December 31, 1980 in accordance with Canadian generally accepted accounting principles applied on a consistent basis.



**A technologist inspects a long-distance (trunk) circuit pack for a DMS-200 switch produced in Northern Telecom Canada's Calgary, Alberta digital switching manufacturing plant.**

*Touche Ross & Co.*

Chartered Accountants

Toronto, Ontario, Canada  
February 6, 1981



## Principal products

### Business communications

Data packet switching networks  
Basic and featured electronic key telephone systems  
Electronic and digital PBX systems (combined voice and data)  
Private and carrier network switching systems

### Cable

Telephone wires  
Composite coaxial cables  
Switchboard wires and cables  
Pulp and paper ribbon insulated telephone cables  
Polyolefin insulated telephone cables  
Universal frame wires  
PVC insulated inside wiring cables

### Central office switching

Step-by-step systems  
Crossbar switching systems  
Electronic switching systems  
Digital switching systems  
Traffic Operator Position Systems  
Centralized Automated Loop Reporting Systems  
Peripheral systems

### Electronic office equipment

On-line terminal systems  
Data entry terminal systems  
Distributed data processing systems  
Remote batch terminal systems

### Outside plant

Customer premises distribution systems  
Central office protectors and connectors  
Subscriber protection devices  
Terminals and closures  
Splicing connectors  
Loading devices

### Power equipment

Power plants  
Ringing and tone equipment

### Subscriber apparatus

Rotary dial, push-button and key telephones  
Electronic and featured telephones  
Style, decorator and novelty telephones  
Coin telephones  
Handsfree speaker units  
Repertory dialers  
Modular hardware  
Headsets  
Specialty and accessory terminals

### Test equipment

Transmission test equipment  
Signaling and supervising test equipment  
Service observation test equipment  
Service analysis equipment  
PCM carrier test equipment  
Loop test equipment  
Trunk test equipment  
Data communications diagnostic test equipment  
Data communications patching and switching equipment

### Transmission

Analog and digital carrier systems  
Analog and digital multiplex systems  
Analog and digital microwave radio systems  
Voice frequency equipment and systems  
Digital line transmission systems  
Optical fiber transmission systems

### Trademarks

The product names Contempra, Digital World, Displayphone, DMS, DRS-8, Imagination, Intelligent Universe, Logic, Omniword, PC-ANI, PLC-1, Pulse, SL, SM, SP-1, Sprinter, Striker,

Vantage 12 and Visual Ear, used in this report are trademarks of Northern Telecom Limited.



## Corporate offices

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### **Northern Telecom Limited**

Corporate Executive Offices  
33 City Centre Drive  
Mississauga, Ontario L5B 2N5

### **Bell-Northern Research Ltd.**

3500 Carling Avenue  
Ottawa, Ontario K1Y 4H7

### **BNR Inc.**

685A East Middlefield Road  
Mountain View, California 94043

### **Data 100 Europe B.V.**

Hamilton House  
111 Marlowes  
Hemel Hempstead, Herts. HP1 1BB  
England

### **NETAS-Northern Electric Telekomünikasyon A.S.**

Alemdağ, Caddesi  
Ümraniye Üsküdar  
Istanbul, Turkey

### **Northern Telecom A.G.**

Drahtzugstrasse 18  
8008 Zurich, Switzerland

### **Northern Telecom (Asia) Limited**

Malayan Credit House  
96 Somerset Road  
Singapore 0923

### **Northern Telecom (CALA) Corporation**

8375 N.W. 53rd Street  
Miami, Florida 33166

### **Northern Telecom Canada Limited**

304 The East Mall  
Islington, Ontario M9B 6E4

### **Northern Telecom Inc.**

Metro Center  
259 Cumberland Bend  
Nashville, Tennessee 37228

### **Northern Telecom International Limited**

33 City Centre Drive  
Mississauga, Ontario L5B 2N5

### **Northern Telecom (Middle East) Limited**

Langton House, Market Street  
Maidenhead, Berks. SL6 8BE  
England

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## **Dividend Reinvestment and Stock Purchase Plan**

Shareholders wanting to purchase additional shares of Northern Telecom Limited can take advantage of a convenient and cost-free investment plan. Quarterly dividends may be invested automatically to purchase additional shares at a discount from the average market price (calculated during a fixed period each quarter). Shares may also be purchased by voluntary cash payments of as little as \$50 to a maximum of \$5,000 during a quarter. In either case, there are no brokerage fees or other service charges. Additional information may be obtained from:  
The Treasurer  
Northern Telecom Limited  
P.O. Box 6121, Station A  
Montreal, Quebec  
Canada H3C 3A7

## **Listing of stock**

Montreal Stock Exchange  
New York Stock Exchange  
The Toronto Stock Exchange  
Vancouver Stock Exchange  
*Stock Symbols*  
NT on NYSE  
NTL on Montreal, Toronto and  
Vancouver exchanges

## **Transfer offices**

Company offices  
1050 Beaver Hall Hill, Montreal  
393 University Avenue, Toronto  
Montreal Trust Company  
Halifax, Winnipeg, Regina  
Calgary, Vancouver  
Manufacturers Hanover Trust  
Company  
New York, N.Y.  
Continental Illinois National Bank  
and Trust Company of Chicago  
Chicago, Ill.

## **Registrars**

Montreal Trust Company  
Halifax, Montreal, Toronto,  
Winnipeg, Regina, Calgary  
Vancouver  
Manufacturers Hanover Trust  
Company  
New York, N.Y.  
Continental Illinois National Bank  
and Trust Company of Chicago  
Chicago, Ill.



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